THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
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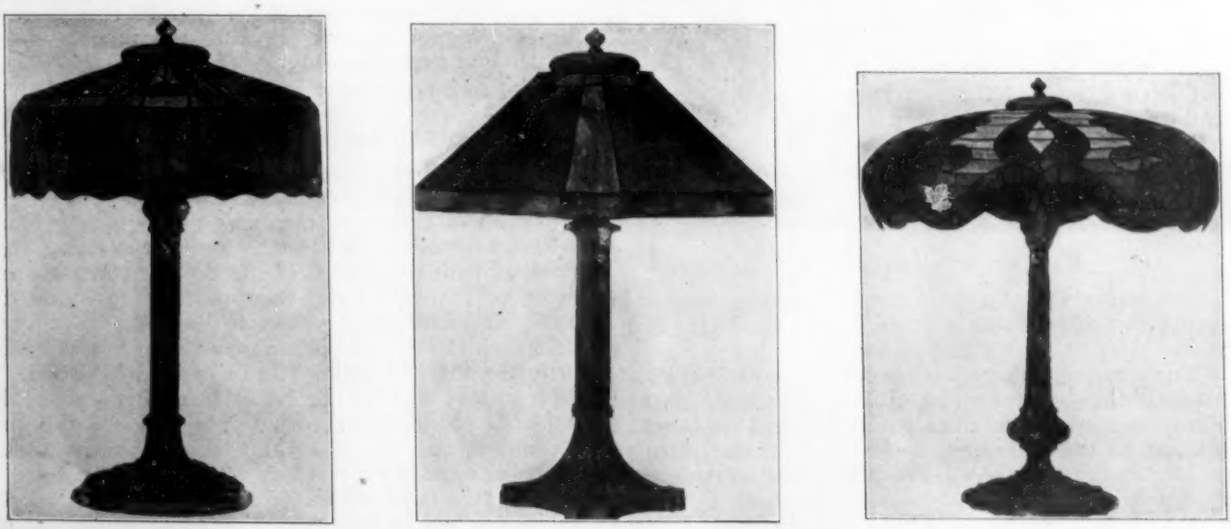
ARTISTIC METAL GOODS PRODUCED BY SLUSH MOLDS.

By Charles H. Proctor.

To the workers in sheet metal—copper, bronze, brass, aluminum, steel and tin—the products of slush molds are an unknown quantity, and very few who work in the lines mentioned are familiar with the details of the operation. This particular branch of the metal industry has reached very large proportions and the capital invested runs up into the hundreds of thousands of dollars.

On every hand as we glance into the windows and show cases of jewelry stores, art metal shops and the large department stores we may notice the beautiful effects in metal produced in the slush mold. All the beautiful novelty clocks in ormolu gold, silver and French bronze, jewelry cases, art metal goods, and many varieties of lamp, gas and electric portable stands are produced in this manner.



EXAMPLES OF ARTISTIC METAL GOODS PRODUCED BY SLUSH MOLDS, MADE BY THE AMERICAN CHASING & MODELING CO. OF NEW YORK.

The metal primarily used is antimonious lead, although some castings are made in zinc and Britannia. Antimonious lead is a by-product of the silver industry which is refined to eliminate as much of the impurities as possible. This is accomplished by constant agitation of the metal during the remelting to bring the dross to the surface. Large quautities of old potatoes are also used in this operation; they are placed in iron baskets and forced to the bottom of the melted metal, when the moisture they contain is emitted in the form of steam, which causes a continuous boiling of the metal as long as any moisture remains. At the end of this operation the metal is poured into pigs weighing from 50 to 100 pounds or more. The refined product contains approximately 100 pounds of lead and 12½ pounds of antimony, sometimes a little more or less. A small amount of copper and tin is usually found in the refined alloy. The advantage of using this alloy is that it melts readily and cools rapidly, producing sharp castings which show every line in the mold. It also has the advantage of expanding when cooling, whereas most metals contract.

The first requisite in producing slush mold castings is a good mold with as few parts as possible for good working. Sometimes the mold is made in one piece for plain or fancy effects in flat work, using only asbestos paper as a backing for the mold to retain the metal in place when pouring. Other molds require two, three and occasionally a dozen pieces to obtain the desired effects in large castings, which weigh as high as 20 pounds or more.

The molds are usually made of bronze metal, although brass is sometimes used, but is not sufficiently hard and fractures easily when the mold is hot. The alloy used principally consists of copper 88 parts, tin 10 parts and lead 2 parts. This is a hard dense metal that resists the continuous heating of the mold and retains its shape better than molds made from alloys lower in copper and tin. The metal is melted in cast iron furnaces, which are sometimes set in fire brick boxes for large amounts of metal; others are a combination stove with the furnace in the top. They hold from 400 pounds to a ton. The fuel is regular nut coal.

In making castings the mold is heated to a point a little lower than the metal itself, this being accomplished first with the aid of a blow pipe and then by filling the

mold once or twice with the molten metal. By the time the second solid casting is removed the mold is ready for the slush operation. The molds are handled with iron rongs and clamps are used to hold the parts in place. The mold is completely filled with the molten metal and is then immediately emptied of the surplus metal which is poured back into the ladle. The casting is at once removed and if found perfect is an exact hollow reproduction of the pattern, whether it be a clock case, jewelry box, or an art metal piece. This is due to the fact that the mold, being a little cooler than the metal, the metal clings to the surface where it is slightly chilled.

A good deal of skill is necessary in casting this class of work. The handling of the mold, its proper temperature, and the correct heat of the metal, the proper venting of the mold—all these are factors influencing the character of the casting. In producing small castings the heat of the metal can be considerably more because small molds cool more quickly; in large castings the temperature must be kept uniform on account of the heat the mold retains; and it is oftentimes necessary to cool off certain parts of the mold with water, especially the gate and parts adjacent thereto.

On large pieces and ornamental groups it is sometimes best to cast the parts in sections, and then solder them together. In this case a solder must be used which melts at a lower temperature than the metal itself; such a solder is composed of 2 parts tin, 1 part lead and ¼ to ½ part bismuth. The flux consists of equal parts of solution of chloride of zinc, glycerine and wood alcohol. The soldering is usually done with a blow pipe, the metal being uniformly heated to near the fusing point and, as the solder melts at a lower temperature, the parts are easily united and a strong joint formed.

I have mentioned the fact that one of the most important features in slush mold work is to have a perfect working mold with as few parts as possible. A good mold pays for itself very quickly and it is therefore sound business policy to obtain the molds from concerns of extended experience and reliable reputation.

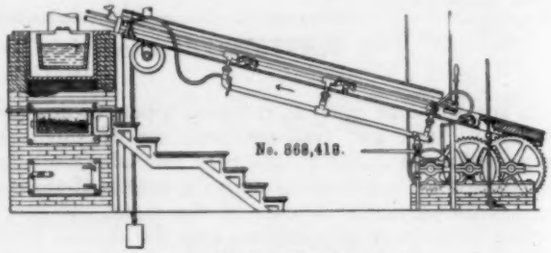
WATCHMAKERS' GUARANTEE IN GERMANY.

Concerning the alliance formed to obviate trouble in regulating and repairing watches, Consul Bardel, of Bamberg, Germany, writes as follows:

"In Germany, where the Government controls the railroads, the post-office, with mail, express, telegraph, and telephone service, and other public utilities, the frequent shifting of the Government officers from one place to another has caused the formation of a new organization. Under the title of 'Guarantie-Gemeinschaft Deutscher Uhrmacher' (Guarantee Alliance of German Watchmakers) a company has been formed which extends already to 230 German cities, with Leipzig as headquarters. The purpose of this association is to assume cooperative responsibility toward the purchasers of watches sold under a guarantee if, during the time of the guarantee, the purchaser should change his place of residence. In such case the purchaser need not mail or express his watch to the original seller if it gets out of order, but he can select in his new abode any watchmaker who is a member of the organization and demand of him a fulfillment of the guarantee given at the time the purchase was made without any expense to the buyer. The members of this organization are distinguishable by show cards hung up in their store windows. Only reliable houses can be admitted to the association.

METHOD OF MAKING COMPOSITE PIPE.

Letters patent granted to Thimas E. Dwyer, of Wakefield, Mass., October 15, 1907, describe a method of providing an iron or steel pipe with a lining of noncorrodible metal such as zinc, lead or other alloys. In carrying out the invention the pipe is first dipped into a bath of molten tin; this heats the pipe and at the same time provides the interior with a coating of tin. The pipe is then removed from the bath and placed over a mandrel, gas jets being provided to maintain



MAKING COMPOSITE PIPE.

the heat. The end of the tube is attached to a carriage which, being set in motion, gradually draws the tube away from the mandrel, bringing with it a lining layer of lead, which is cooled as it leaves the end of the mandrel and solidified by a cooling device. With this method there is practically no cooling of the tube between the time it leaves the tin bath and the time when it is again heated by the gas burners, and there is therefore no opportunity for injury to the coating of tin which results from allowing the tube to become cooled and then reheating it. The tin coating remains in firm union when the lead is poured.

THE USE OF BRASS FOUNDRY GASES.

For a man who possesses the real spirit of economy there is a feeling of definite loss when he sees gases, as from brass furnaces, escaping at high temperature without further useful effect. The steam engineer, not content with the design of the boiler, which abstracts most of the heat from the products of combustion, seeks supplementary service in the form of an economizer which reduces the temperature to a possible 200° or lower, thereby saving 10 to 15 per cent. in fuel. The intermittent use of the brass furnace does not lend itself to combination with any system that requires continuous impartment of heat, as for heating adjacent rooms and the like.

But there is usually at hand an opportunity for the saving of fuel by the extraction of some heat at least from the gases in their passage from the furnace to the atmosphere. That is the core oven. The temperature therein will ordinarily range from below 200° to somewhat over 400°, while the brass furnace gases will always be hotter. If the furnace and ovens are near enough together, it is possible by means of a by-pass arrangement to turn the gases into the ovens when opportunity presents. Of course the stack of the oven should be tall enough to give good draft, and crooked or small flues should be avoided. The resistance must not be sufficient to cause serious blowing of gases around the furnace lids. When the size of the plant will warrant an induced draft fan may be arranged to draw the hot gases from the ovens and discharge through a short stack above the roof.

THE BRASS FOUNDRY.

Modern Methods of Melting and Handling Metal.

By W. S. Quigley.*

There are many new brass foundries being erected, each with some improvement, but few are anywhere near the mark.

The layout is generally haphazard, embodying local or pet ideas of the designer, but without any comprehensive plan being followed.

The modern molding machine was the first real advance made, and should be credited with doing more to draw attention to the possibilities of improving the foundry than any other device.

The mechanical men had long before given it up as a hopeless task to get the brass foundry out of the rut it was in, and I know of nothing that expresses the feeling so well as the story told of a foreman who shouted "Drop that" to an Italian laborer who had abandoned his shovel and put his hands upon a wheel-barrow "drop that, an' take up your shovel! Phwat d'yez know about machinery, ye Dago?"

Formerly the brass foundry had held out little or no inducement for the progressive or technical man, the chances of making a name or advancing from the foundry to any important position being remote, the remuneration small and the name of being a foundry man was considered somewhat degrading, and I am sorry to say, to a great degree, this is so to-day. How many superintendents of motive power or master mechanics and mechanical engineers to-day are thoroughly conversant with brass foundry practice, and do not rely entirely upon their foundry foreman for all information relative to his department. It is the greatest satisfaction for a good foreman to feel that his superiors understand and appreciate his efforts, and nothing is so demoralizing as leaving the average foreman to depend upon his own resources. How often I hear the statement, "I've asked for this, or that, or told them this, or that, until I'm tired; if they don't care, I don't."

Perhaps an actual experience of mine in a Cleveland foundry will cover the point I wish to convey. I was advised that a furnace I had sold was not giving satisfaction, that the foundry loss had increased, and unless something was done the order for the second furnace would be canceled. Of course, the next morning after the receipt of the letter found me at their factory. Having entrée to the works, I went at once to the foundry. The foreman, recently appointed, was an easy-going fellow with no energy, but as the manager said, "steady man and a darn good molder." Through freely conversing with the men who confided in me and careful observation, by the time the manager arrived I had learned enough to satisfy myself that the conditions were very bad, but was at a loss how to acquaint him with the condition, as it was necessary to severely criticize his management. He asked me what I had to say for myself, and said he had about decided to throw out the furnace and go back to crucibles, as the foreman said it was "no good" and caused all the trouble. Asked him to go out and look over the situation with me, and he replied that he didn't have time, but would call the foreman in. This he did, and the foreman passed a very clever examination, blaming everything on the furnace, which he said he never believed in from the first.

After the foreman had gone, I asked the manager if he wanted me to be candid and wouldn't put me out if I told him what I had learned during my short stay in the foundry. He agreed. My report was something as follows:

I. One belt off blower, other belt very loose.

II. Insufficient air blast.

III. Mercury pressure gage glass broken, therefore pressure unknown, but foreman thought pressure didn't make much difference.

IV. Furnace neglected, lining thin and badly in need of repairs.

V. Large accumulation of slag of high metal value—several thousand pounds of which was both in furnace and piled in yards.

VI. Furnace tender dissatisfied, contemplated going to work in Mansfield with former foundry foreman, only interested in quitting time and pay day.

VII. No systematical arrangement for taking metal from furnace as soon as melted. It would remain in furnace from 15 to 45 minutes after being ready to pour.

VIII. Foreman generally incompetent. His qualifications being, as before stated, "a steady man and a darn good molder."

IX. Manager too busy to see what was going on for himself.

At first he demurred, but finally agreed to follow out suggestions, with following results:

I. Blower and furnace were put in good order, air gage repaired. Result, proper melting conditions, quick heats, hot metal, low loss, good castings.

II. Furnace tender's wages increased from $12 to $18 per week. Result, satisfied man, eager to retain his position, furnace kept in good condition, and metal carefully melted.

III. Large accumulation of slag containing 70 per cent. to 80 per cent. good metal, reclaimed by adding a certain portion to each heat.

IV. Arrangements made to take metal from furnace as soon as melted by pouring whatever molds were ready without waiting for molders' entire floor to be set up.

V. Foreman severely criticized and given some pretty plain orders for future guidance—he has since been replaced by a more competent man.

VI. Manager arranged to go in foundry once or twice a day and see things for himself.

The grand result was a reduction in the number of bad castings, more metal melted and proportionately less fuel, metal shrinkage fell, according to monthly inventory, from 11 per cent. to 7 per cent., a good showing, considering amount and quality of scrap used, in itself an actual saving of $33.02 per day or $858 per month, the only additional outlay being the $26 added to the furnace tender's wages.

It is only proper to add that the finishing department of this concern contains one of the best equipments in this country, and that the management prided itself on its low cost of production, and I will say that in no other department could a condition of this kind have existed. Yet this is only one of a great many instances of this kind which have come under my notice.

The value of the raw material melted each day in this foundry was over $1,300.

In the following statements, most of the data was obtained from the operation of the Rockwell double-chamber melting furnace, with which I am familiar, but by the request of those from whom the figures were obtained, I will not use any names, although the original papers and figures will be willingly shown to anyone who is interested.

Early in 1904 a New England valve manufacturer installed an oil furnace, and to determine if the statements

*Abstract of paper read before the New York Railroad Club, November 15, 1907.

made by the makers were correct relating to tensile strength and density of like mixtures of metal when melted in an oil furnace, as compared with that melted in a crucible, and the following mixture was melted both ways:

Copper ingots	100	forms
Hard metal	100	"
Chips	150	"
Lead	6	"
Spelter	5	"
	361	"

Two specimen bars were made from each and turned to the following dimensions:

Length of stem in inches	7.00
Diameter of stem in inches	0.798
Area of cross-section in square inches	0.798

Physical tests made on a Riehle testing machine.

The tensile strength and elastic limit in pounds per square inch of original section. Elongation after rupture, per cent. of original length. Reduced area after rupture, per cent. of original section resulted as follows:

OIL FURNACE.

	Tensile Strength.	Elastic Limit.	Elongation.	Reduced Area.
	27,400	12,640	12 ½ %	20%
	28,650	13,620	15 %	20%
Average...	28,025	13,130	13.64%	20%

CRUCIBLE FURNACE.

	27,420	12,800	16 %	20%
	25,300	13,040	11 %	19%
Average...	26,360	12,920	13½ %	19½%

Although the average is in favor of the oil furnace, it will be noted by the following analysis of the chips from the tset bars that the mixture varies slightly, which may be accounted for by differences in composition of the chips and hard metal used.

	Copper.	Tin.	Lead.	Iron.	Zinc.
Oil furnace ...	87.73%	4.18%	3.38%	1.0%	4.61%
Crucible furnace	86.82%	3.94%	3.65%	1.0%	5.49%

After the specimens had been fractured the gripping ends were bored to one (1) inch inside diameter and turned to one and two one hundredths (1.02) inches outside diameter with ends left of suitable dimensions to be threaded to fit a 1-inch standard fitting and subjected to an internal water pressure of 1,600 pounds per square inch. This failed to show any signs of rupture or any increase in diameter of the specimens, and as pressure used was the limit of the pump, no further attempt was made to establish the bursting strength of the metal.

The oil consumption averaged 1.53 gallons per 100 lbs. of metal melted and the result compared with melting in crucibles in this particular foundry was as follows:

Average loss, oil furnace	3.18%
Average loss, crucible furnace	3.25%
Total cost per ton of metal melted in crucible furnace	$5.18
Total cost per ton of metal melted in oil furnace	3.36

or a net saving of $1.82 per ton of metal melted.

A large trunk line railroad kindly furnished me a blue print covering an exhaustive test worked out in detail very carefully, of 9,534 pounds of bearing metal made up as follows:

Ingot copper	2739½	lbs.
Scrap copper	6	"
Scrap	5891	"
Lead	503½	"
Tin	255	"
Zinc	137½	"
Metal in ladle	1½	"
	9534	

The results are shown in the following table:

Total brass melted	9534	lbs.
Total good castings, exclusive gates and sprues	7468	"
Total oil used	153.84	gals.
Oil used per 100 lbs. metal melted	1,615	"
Oil used per 100 lbs. castings produced	2.06	"

As the life of lining in this foundry averaged over 200 heats, of 1,500 lbs. per heat, each lining produces 300,000 lbs. of metal and costs $30, which makes the total melting cost, exclusive of labor and power, about $0.0656 per hundred 100 lbs. melted, figuring the cost of oil at 4 cents per gallon.

RECORD BREAKING RUN FOR SCHWARTZ FURNACE.

On November 29, 1907, the brass foundry of a large American industrial establishment made a record-breaking run in a 42-inch Schwartz furnace. The charging of the furnace was commenced at 7:25 A. M. and the metal drawn at 5:25 P. M. In that time 17 heats of 500 lbs. and one heat of 600 lbs. were melted, a total of 9,100 lbs. The metal was all in good condition and all went into castings. Fourteen of the heats were of yellow brass, two of red brass, and two of manganese bronze. No especial preparation was made for the test.

FUMES FROM MELTING BRASS.

(*From Our British Correspondent.*)

It is somewhat remarkable that the first sign of resentment over the new Home Office rules regulating brass-casting has come not from Birmingham, the recognized British home of the industry, but from Walsall, a town about seven miles away, whose staple trade is leather, but who have some forty brass-casting firms, many of whom produce various knick-knacks for saddlery requirements. The Chamber of Commerce recently discussed the new rules requiring an efficient exhaust draught for the removal of fumes from casting shops. The principal spokesman was E. J. Shaw, who declared that the rules were unnecessary as the present system of open windows with the large open space in the roof was sufficient to clear away all fumes. Other regulations complained of were those requiring employers to provide a lavatory under cover, a daily supply of clean towels, soap, nail brushes, hot and cold water. The meeting was inclined to approve of the exclusion of females from casting shops, and the requirements that the workpeople should wash their hands before leaving the shop or eating their food, though it was pointed out that in many cases where lavatory requisites had been provided, the men had refused to use them. Some of the founders declared that their fumes were nothing compared wth those in Birmingham, where half a ton of metal is smelted at a time. It was decided to send a deputation to the Home Department with the suggestion that the factory inspector should have power to say whether the ventilation provisions were already adequate or otherwise.

It is estimated by lead specialists that 20 per cent. of the lead production goes into the covering of copper cables. The largest consumption of lead is in the manufacture of white lead.

BRONZE TABLETS FOR BALTIMORE.

We here present engravings of the bronze tablets which are to be placed on the Centre Market Buildings, which have been erected on the grounds where stood the Maryland Institute before it was destroyed by fire, February 8, 1904. These tablets were cast by J. Register's Sons Company, of Baltimore, Md., manufacturers of brass and bronze castings of all kinds. They measure 5 feet high by 3 feet 9½ inches wide and the thickness of the metal is 5-16 of an inch, the average weight being 450 pounds. Six of these castings were made without one being defective, which speaks volumes for the skill displayed in their execution.

The mixture consisted of the following:

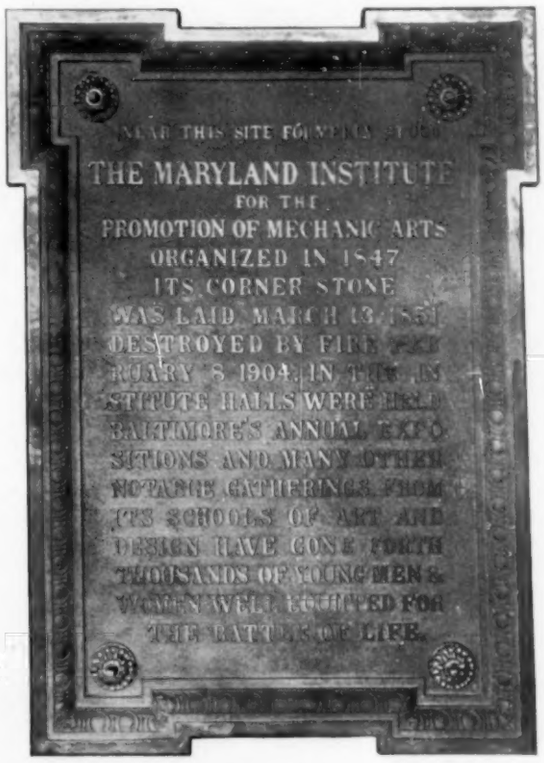
Copper	16	parts.
Lead	½	part.
Block tin	1	"
Spelter	½	"

The tablets were poured from four crucibles at the same time and it was necessary to run down 650 pounds of metal for each. It required eight men to do the pouring for each. They all came out perfect and not one had to be recast or burned in.

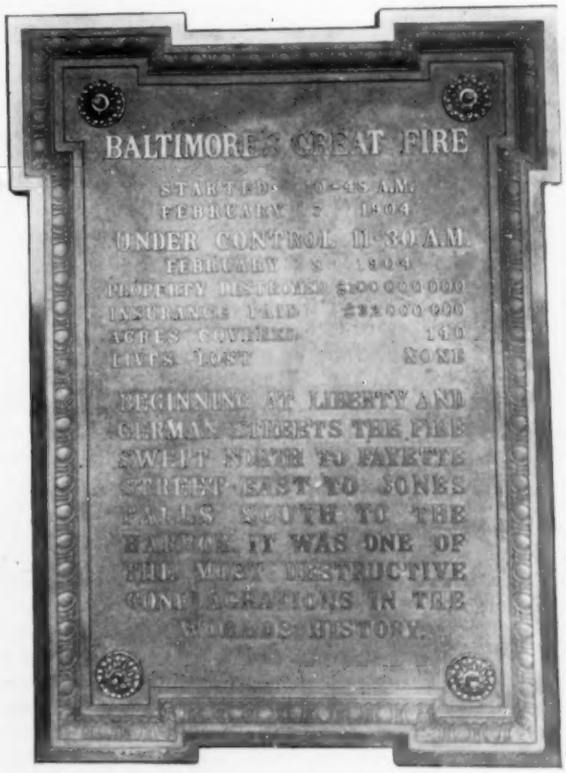
COMMISSION.

AN ANCIENT BRASS WORKING FAMILY.

Next year Herr Emil Schleicher, of the firm Mattheu Louis Schleicher's Sohn, of Stolberg, Rheinish-Prussia, will celebrate the 333d anniversary of the establishment of the firm. It was founded in 1575, by his lineal ancestors. The Schleichers lived in the Palatinate back in the twelfth century where they had already engaged in brass founding. Not only have all the male Schleichers of successive generations been brass founders, but they have been allied by marriage with all the principal brass manufacturing establishments of Dinant in Belgium. The firm has always worked in harmony with its employees and supported Building and Provident Societies within the works. On the occasion of the 330th anniversary, the head of the firm presented $250 each to two men, whose father, grandfather, and great-grandfather had successively worked for the firm for 150 years.



MARYLAND INSTITUTE.



BALTIMORE FIRE.

SOME MODERN BRASS FURNACES IN ENGLAND.

LECTURE IN BIRMINGHAM, ENGLAND.

A lecture was delivered to the Birmingham Metallurgical Society at the Technical School, Birmingham, England, on Tuesday, June 11, by C. F. Davies, the chair being taken by A. H. Hiorns, the president. The lecturer said that although the working of brass was one of the most ancient industries it would seem that for many centuries no serious effort had been made to deal with it in the foundry on the large scale and it was only within the last five years or so that brass founders had succeeded in melting their metal otherwise than in comparatively small crucibles in the old coke pot furnaces. It was decidedly an advantage to the foundryman to be able to melt larger quantities of metal in one heat, especially in the case of big castings or strip ingots since that made for uniformity and homogenity of mixture. One man could look after all the metal required for an average sized brass foundry and there was an economy of time which would otherwise be lost by reason of the small crucibles losing heat during pouring. There was also an increase of output because the foundryman was relieved of the duty of attending to the pot furnaces and the melting of the metal and could confine his attention to making the molds. Most of the modern furnaces were either oil or gas fired, which promoted cleanliness, reduction of labor in carrying fuel, ashes, etc., lowered the heat of the foundry and abolished the noxious fumes always given off from coke pit furnaces.

Of the modern furnaces invented within recent years four had proved successful, one made by an English firm, while the others all emanated from the United States. These were: The Morgan patent tilting furnace, made by the Morgan Crucible Company, Ltd., of Battersea, and the "Steele-Harvey," "Rockwell" and "Schwartz," all of America.

The lecturer proceeded to describe the various furnaces, commencing with the Morgan furnace, of which a model was exhibited. This furnace, it was explained, was made in three types and various sizes to take crucibles of from 400 to 1,000 lbs. capacity and the object was to obtain a rapid and economical melting of large quantities of metal using forced draught and pouring without removing the crucible from the furnace. The tilting of the furnace was effected by a wheel in one type and by the lifting of the back portion by means of chains in another type. The life of the crucible was from 40 to 60 heats. It was claimed that these furnaces would melt 400 lbs. of brass in forty minutes with a coke consumption of 45 lbs., and some results given for one day showed that, including the lighting up, the output was 453 lbs. of metal per heat, with 77 lbs. of coke, or 19 lbs. of coke per cwt. That would be about 3½ cwt. coke per ton. Reckoning the day from 7 A. M. to 5 P. M., six or seven heats of brass could be taken out per day.

A description followed of the Steele-Harvey. This furnace, it was explained, somewhat resembled the Morgan and with the smaller crucibles working from 120 to 180 lbs. it should be possible to get 15 to 20 heats per day, and with two larger for 375 lbs. and 825 lbs. it should be possible to get 9 and 5 heats respectively and the lining should stand about 500 each. The oil consumption worked out at about 6d. per 100 lbs. of metal or 11s. per ton.

Some attention was next devoted to the "Rockwell" furnace, the feature of which was that crucibles were entirely dispensed with and the metal melted in the furnace body itself. The furnace was in two chambers, which could be used alternatively during the day. In the furnace he had they had some trouble at first because the fan was too small and the oil needed warming. The ladles consisted of malleable iron, lined with fire clay. The time taken to get down the heat after the first was about 40 minutes and the oil consumption cost about 12/6 per ton of metal melted.

They had found the ganister much cheaper for lining than carborundum.

The "Schwartz" furnace is somewhat similar to the "Rockwell," but had only a single chamber.

DISCUSSION.

The chairman remarked that the question of cost must eventually determine the kind of furnace generally adopted. He did not see why some such furnace should not be adopted for the melting of steel in small quantities in view of the great expense required for putting down the usual large steel foundry. He thought it a disadvantage that the coke had to be broken so small for the modern furnaces which must have the effect of increasing the coke bill. But it was a decided advantage that the crucible in the Morgan furnace had not to be removed. That avoided the rapid alternations of temperature which was such a fruitful cause of cracks. His own impression was that Messrs. Morgan had introduced a coke furnace because English manufacturers were not accustomed to use oil. It seemed to be a sufficient reason that their fathers and grandfathers had been satisfied with coke. He thought the double furnace might be very objectionable through the products of the combustion of the oil getting into the metal. It was a question whether something might be done to keep it back.

Mr. Thomas pointed out that in addition to the furnaces named there were French and German furnaces, but they were very unsuccessful. His own experience of that class of furnace had not been very inspiring. Theoretically they were very admirable. He thought the question of coke was not altogether one of habit. Oil might become exhausted, but while there was so much demand for gas they might depend upon having supplies of coke, and from that point of view Messrs. Morgan's furnace ought to be appreciated. He thought one of the advantages of the large furnace was the opportunity it furnished for reducing the swarf into ingots. But a disadvantage was that it took up a great deal of room, which was an important consideration in Birmingham, where so many foundries worked in cellars and in the second stories of buildings. The big furnace was almost impossible to people in a small way, because it would take up half the foundry. Another disadvantage was that if the one big furnace went wrong they were beaten, but with an ordinary crucible they had other small furnaces to fall back upon. He did not see much advantage in taking the moulds to the furnace as compared with taking the furnace to the moulds. He had known the crucible break and the whole molten metal to run amongst the cinders and they had a huge mass of stuff with which nothing could be done except to put it under the steam hammer. He would like to know whether there was any better means of regulating the temperature so as to enable them to keep back the furnace until they were ready to use it. He would also like to know whether common desulphurized oil, similar to that used by the Admiralty for firing small boilers, would be as good as ordinary crude petroleum.

Other questions related to the use of ladles and the employment of producer gas.

Mr. Davies in reply said he thought Mr. Hiorns had exaggerated the importance of the breaking up of the coke because they could get a fairly large lump of coke into the furnace. As to the danger of getting the metal running away the object of the ash tray was to prevent it getting down into the flue. The regulation of temperature presented no difficulty because there was an air valve for the purpose. And both the supply of oil and the supply of air could be controlled. They could slow down the furnace if the moulders were not ready. They had more frequently found it convenient to hurry up the furnace than to retard it. With regard to fuel, Texas oil had been found quite satisfactory, costing £3 a ton. There was no objection to the use of ladles and his practice was more commonly to use them.

The lecture was illustrated by a number of views and sketches, several views of furnaces being taken from THE METAL INDUSTRY.

PRODUCTION OF TIN DURING 1906.

During the year 1906, according to the report of Frank L. Hess to the U. S. Geological Survey, the only actual output of metallic tin in the United States was 2,500 pounds produced from 3,750 pounds of concentrates at the Gertie Mine, in the Black Hills of South Dakota. This mine is now 500 feet deep. Buck Creek, Alaska, produced 45 short tons of stream tin, and the Bartels Tin Mining Company, at Cape Prince of Wales, produced about 10 short tons of concentrates, carrying 64 per cent. metallic tin, which were shipped to England. About 14 short tons of concentrates were produced in the North Carolina-South Carolina tin field. The estimated value of the total output, including metallic tin and concentrated ores, was $35,600.

In Alaska much prospecting has been done, particularly along the streams flowing to the Arctic Ocean, and while tin bearing gravels have been encountered, the yield has so far been insignificant.

In the Black Hills of South Dakota interest in tin mining has been greatly revived by the high price of the metal, and a number of tin deposits have been re-examined with a view to beginning mining operations. There seems to be little doubt that there are a number of claims having lodes that will yield from 0.5 to 1.75 per cent. metallic tin. Prospecting has been also carried on in North Carolina, Texas, California and Idaho, with the prospect in no case being very favorable.

FEDERATED MALAY STATES.—Owing to the very high price of tin during the year 1906, prospecting for the ore was greatly encouraged all over the world, but in spite of this the output of the Federated Malay States, the principal producer, was somewhat less than that for 1905, as that had been less than the production of 1904, because of the impoverishment of many of the shallower and richer placers. The high price, however, allowed the working of ground which would have been much too poor to work under the prices existing in previous years. During the year the British Government, with a view to retaining the smelting of tin in the Federated Malay States, increased the export tariff upon tin.

The production of tin in the Federated Malay States in 1906 was 54,584 short tons as against 57,179 short tons in 1905, a decrease of 2,594 short tons.

During the year the imports of tin into the Federated Malay States amounted to 8,904 short tons, mostly from Siam and the Dutch East Indies, but including also a considerable quantity from Western Australia, sent to Singapore for smelting. The total exports for the year 1906 were 64,922 short tons, as against 65,187 tons for the preceding year.

SIAM.—Much prospecting has been carried on during the year and tin is being worked in 21 provinces. The annual production is estimated to be about 5,000 short tons, valued at $2,900,000.

BURMA.—Some tin mining is carried on and it is claimed that the future output will be large, but so far it is but a small factor in the world's production.

CHINA.—The Imperial Maritime Customs reports that during 1906 China exported 4,538 short tons of tin against 5,020 tons for the previous year. Only high prices bring the Chinese tin into the open market. The mines are said to be largely alluvial, only the upper and softer parts of the veins being worked.

BANKA AND BILLITON.—Under the influence of the high prices the output was increased over that of 1905. A total quantity of 2,158 short tons was sold by private tender at Batavia during 1906, and 269,324 slabs, equal to 10,055 short tons, of Banka tin were sold in Holland during the year. The production of Billiton for the year 1905-6 was 4,997 short tons. There has been a gradual decrease in the tin mined in these two islands during the last ten years, except for the considerable recovery within the last two years, owing to the rise in price.

AUSTRALIA.—As in other countries, tin mining received a great impetus during the year in Australia, with the result that there was a considerable increase in the output, especially in Queensland, where the increase came largely from the lode mines. The production for the year was 5,402 short tons, valued at $2,385,962, the largest output for any year since 1874, being an increase of almost 1,000 tons of ore over the production of 1905, which was 4,418 short tons. The output of tin ore in Queensland since the beginning of tin mining in that country in 1872 to the end of the year 1906 amounted to 121,932 short tons. The percentage of the ores is unknown, but they are supposed to run about 65 per cent.

The Mount Bischoff mine in Tasmania remains one of the greatest lode tin mines of the world, although its output for the year was exceeded by that of the Briseis-New Brothers Home No. 1 placer mine. During 1906 the former mine produced a total of 1,182 short tons of concentrates. At the Briseis-New Brothers Home No. 1 mine 57,700 cubic yards of gravel, yielding only 111.1 short tons of tin concentrates, were sluiced at a profit. In the Pioneer mine 439,400 cubic yards of gravel gave a yield of 2.156 pounds of concentrates per cubic yard. The total yield of tin ore for Tasmania was 5,010 short tons, valued at $2,711,937.

BOLIVIA.—The bulk of the output of Bolivian tin is derived from lode mining, although there are workable placers which at times give a small output. The Bolivian tin ore is comparatively impure ore, containing much sulphur bismuth, arsenic, and antimony. However, the output has become so great that it is playing a considerable part in the world's markets, and there was substantial increase during 1906 over the output of 1905. Only a small part of the Bolivian output is smelted in Bolivia, most of it going to Germany or to England for reduction.

According to the report of the American minister at La Paz, the Bolivian tin production (exports) in 1906 was 32,375 short tons of barilla, or 19,425 short tons of metallic tin. During the year new deposits of tin are said to have been discovered in the province of Cochabamba, east of the deposits worked at present.

ENGLAND.—The output during the year was 6,690 tons, valued at $3,050,230. Much tin ore is shipped into Cornwall from foreign countries for smelting.

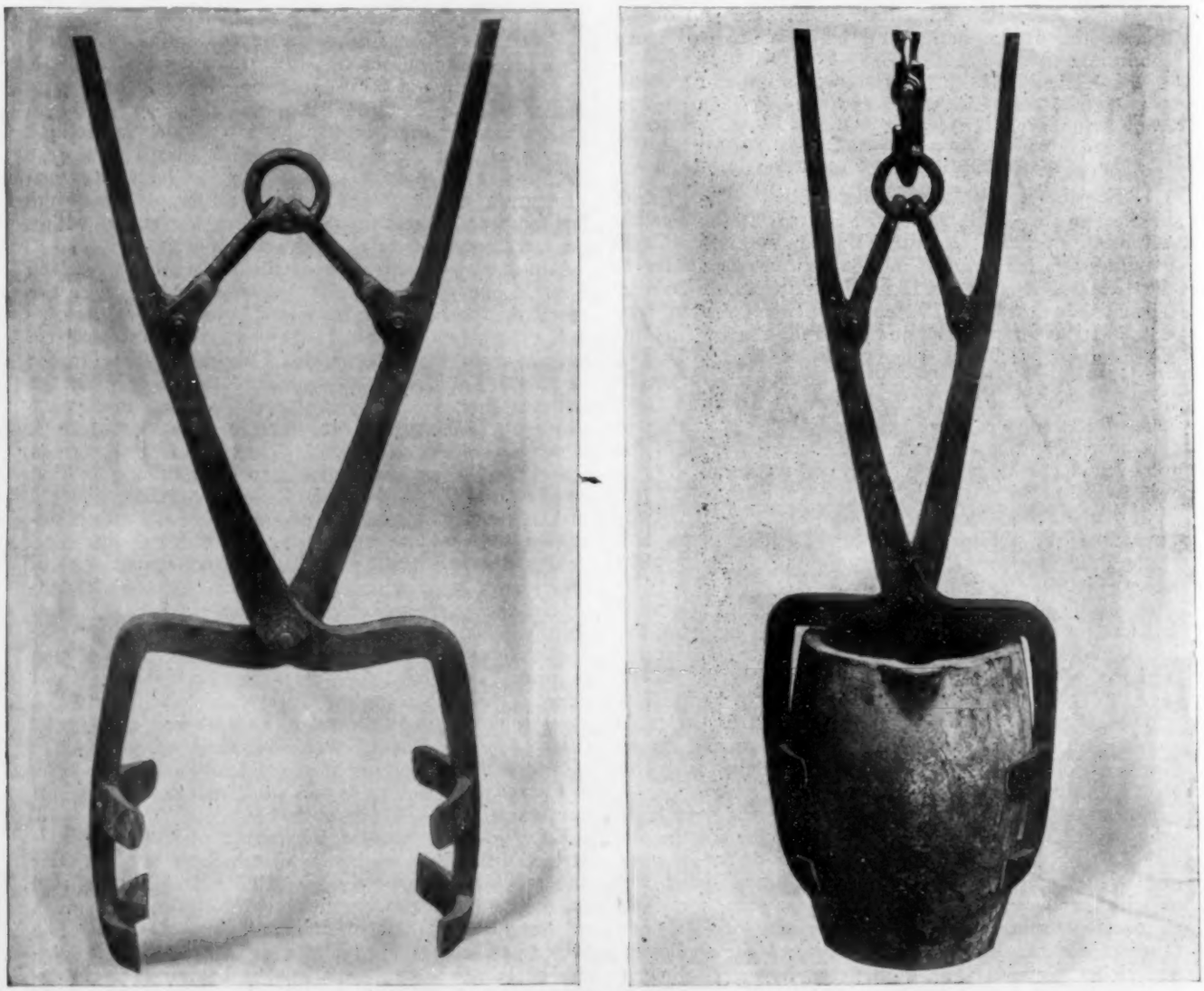
CRUCIBLE TONGS.

By Dudley A. Johnson.

The life of a crucible is influenced largely by the handling, and second only in importance to the annealing and the first heating is the fit of the tongs and the kind of tongs used. There are three general styles of tongs in use, which may be classified as follows:

One-pronged tongs;
Two-pronged tongs;
Spade tongs.

The latter is so named because the bottom part is shaped like the ace of spades. These three styles may be either of the ring pattern or the grab pattern, as shown in the cut.



CRUCIBLE TONGS.

The one-pronged tongs may be satisfactorily used on small crucibles only, but for sizes above No. 40 the two-pronged tongs should be universally used. It is a matter of no vital importance whether the bottom prong is of the spade pattern or like the illustration. The main thing is to have them fit the crucible perfectly from the bilge or widest part of the pot down to within two or three inches of the bottom. If the tongs come too near the bottom of the crucible, they are liable to interfere when setting it into the shank. If too much space is left, the pot is liable to be squeezed.

It should be borne in mind that the crucible tongs should take hold of the pot below the bilge and lift it out of the fire with the least possible pressure, just the same as if it was picked up in the shank or in a basket. It may be said that it is impossible to put the tongs low enough down on the crucible in a coke or coal fire, and, under certain conditions, this may be the case, but we are quite sure that in nine cases out of ten, if the furnace is of the proper construction and the firing intelligently done, that there will be no necessity for lifting the pot twice, first out of its bed by taking it with the tongs above the bilge, thereby not only injuring the pot but pressing the tongs out of shape, and secondly, placing the tongs where they belong and bringing it from the furnace. The fuel space around the crucible and at the bottom should be sufficient so that one firing will take off the heat. In the case of smelting and refining companies, who are melting light scrap, this may be impossible,

but with the rank and file this can easily be done. The consequence is that, when the crucible is ready to pull, the fuel has settled down and practically disappeared, and there is no trouble about putting the tongs where they belong.

The spade pattern tongs were designed to push the fuel away as they went down alongside the pot, but they have not quite the bearing surface of the two-pronged style.

In the two-pronged pattern the lower prong does most of the lifting and the upper prong steadies the crucible so it will not wobble, but both should fit snugly. In the illustration it will be noted that there is ample space between the tongs and the side of the pot above the bilge, also that the tongs are square-shouldered. This is to prevent possible squeezing of the top of the pot. It is too often the case that the tongs are made with round shoulders so that, when they are placed well down, the first point of contact, as they close together, is the extreme upper edge of the crucible, and it is inevitable that pieces will be broken out of the pot.

We have seen large crucibles, size 200 to 300, lifted from the fire with one-pronged tongs which were bow-legged; that is, the first and only point of contact was the bottom of the lower prong, and it is plainly to be seen that this practice will soon cut the crucible in two.

We have also noted tongs that were originally of the two-pronged pattern, used on size 60 and 70 crucibles, with the lower prong cut off on account of the small space between the pot and the furnace wall, and the consequence was every pot of metal was lifted from above the bilge; also crucibles pulled from the fire with one-pronged tongs where the prongs were bent so the crucible was tilted way to one side by the time it reached the top of the furnace, all of which can readily be seen is bad practice.

We repeat that the one-pronged tongs should be used only on the smallest pots, or for the purpose of setting an empty pot back into the fire. We recommend strongly the two-pronged pattern for all other work, and above size 60 tongs of the grab pattern, as shown in illustration. Of course this necessitates some kind of a hoist, but when it is remembered that the weight of a No. 70 crucible full of metal, together with the tongs, is above 250 pounds, it will be plain that a hoist is not only a convenience but a necessity. The pressure on the pot is regulated by the weight, and with grab tongs properly designed and kept in shape, the pot cannot be injured.

On the small sizes, where ring tongs are used, the handles should be made light and springy and stand just the right distance apart when in position to squeeze ceive the ring, so that it will be impossible to squeeze the pot. It must be remembered that the crucible in its white heat stage is soft and leathery, and there is enormous pressure exerted when the handles are forced together and the ring driven on, and, although no immediate bad results may be apparent, the crucible walls will be fractured little by little.

In well equipped, up-to-date foundries, two separate pairs of tongs for each size crucible are used, one for the crucible when it is new and another for the same crucible when it is half worn out. As the pot gets smaller after each heat, it is obvious that the tongs that fit a new crucible will be too large for an old one.

In some of the late oil furnaces they use tongs of the grab pattern with the handles above the ring bent over at right angles; as there are no ashes or fuel to contend with in the oil furnace, the tongs go right to their place without effort, and these bent handles allow the operator to stand off to one side.—*Graphite.*

NEW BRASS WORKS.

A recent incorporation under the laws of the State of New York is the Century Brass Manufacturing Company, located at Cattaraugus, N. Y., on the Erie Railroad, about fifty miles southwest of Buffalo. This is an old company under a new name, with new capital, new machinery, and a general renovation throughout. This company manufactures a general line of brass goods and plumbers' supplies and is equipped for special work.

The general arrangement of the factory is on the principle of the "continuous mill," the first unit being the brass foundry, provided with seven furnaces, equipped for both bench and machine molding, the machines being the Tabor molding machine, operated by compressed air. The core room adjoins the foundry, utilizing the same chimney. After the castings are weighed and cleaned, they enter the machine shop, where seventeen Warner & Swasey automatic turret lathes perform the necessary operations. From here they are conveyed directly below the machine room to the finishing room, where grinding, oiling, buffing, polishing, etc., are accomplished. Here the goods are gone over for the second time by the inspector, and being passed upon are removed to the nickel-plating room, where they are electro-plated. From here they pass directly to the assembling room, where they are assembled, and again tested both under hydraulic and aerostatic pressure. They are then removed to the packing room, which adjoins the shipping room, and carefully packed and shipped.

The very best material and workmanship are employed throughout, which, combined with the careful finishing, inspecting and testing, have given these goods their enviable reputation for the past twenty-five years. Hereafter they will be known exclusively as "Century" goods.

CORBIN CLUB HOUSE FOR EMPLOYES.

P. & F. Corbin and the Corbin Cabinet Lock Company, of New Britain, Conn., have just opened a new club house, fitted up and completely furnished by the companies, for their employes. The house was opened November 20, when Charles H. Parsons, first vice-president of P. & F. Corbin, acted as master of ceremonies, and introduced Philip Corbin, president of the company and its head and active manager since it was founded, over half a century ago. Mr. Corbin responded most fittingly, referring to the time when he was a foreman, working for others, and assuring the men that he always did and always would appreciate the faithful and conscientious work of his assistants in the business. He presented the keys of the club house to the presidents of the clubs, who responded with thanks and appreciation. A reception to the foremen followed, after which there was a general good time between the officials and the heads of the departments, promoted by Mr. Parsons informally announcing: "Boys, the house is yours; have a good time."

The American consul at Frankfort-on-the Main, Germany, reports that copper has not been as high in 40 years, and although the production has been largely increased consumption of this metal has been even larger. Frankfort is the center of the German metal trade, and its prosperous condition has resulted in the establishment of a mining and metal bank with a capital of $9,520,000.

SHEFFIELD PLATE AND ELECTRO PLATE.

By L. E. Taylor.

It is a somewhat curious fact that the first manufacture of old Sheffield plate was really a sham, for the base metal was covered or coated with a better metal, so that now people set a higher value upon old Sheffield plate if they can discover the base metal beneath the surface. Yet in the first instance when Sheffield plate was introduced the main object was to disguise the base metal as much as possible to make it pass for something of greater value. In old Sheffield plate the silver coating was evenly soldered on to the copper base and a deeper coating of silver was bestowed upon Sheffield plate than upon electro-plated goods, yet the best qualities of electro-plated articles are more valuable than light sterling silver goods.

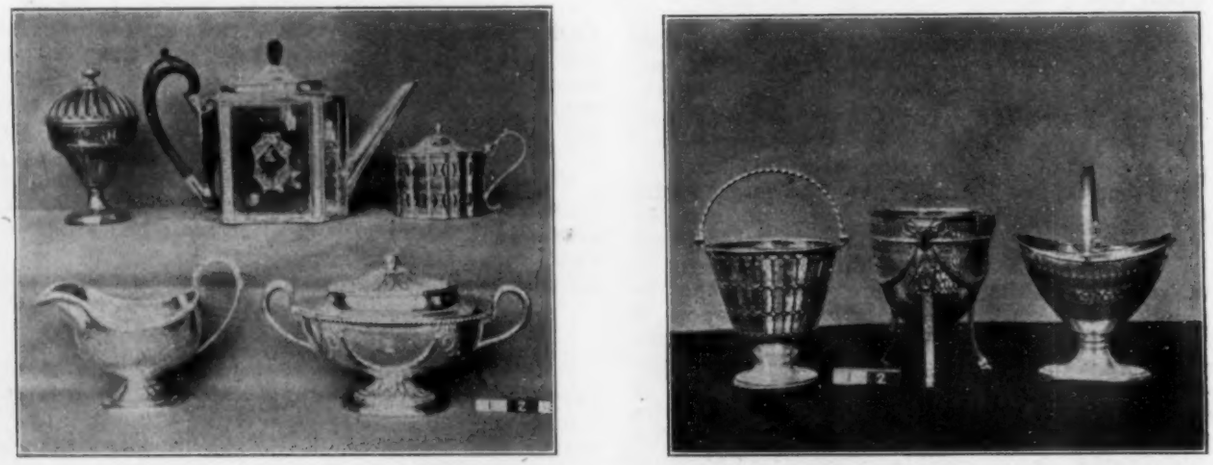
Before Sheffield plated ware was introduced mercurial, water or fire gilding was largely used for coating the surfaces of copper or brass ecclesiastical plate and was used similarly for other articles.

The nearest resemblance to Sheffield plating was "pyro" plating and this method, though not so popular as Sheffield plating, is still in existence. The process consists of burning the more precious metal into the surface to be coated. When this is done the coated metal is subpected to heat in a muffle and while hot is plunged into cold water. This force of contraction causes the silver coating to penetrate deeply into the pores of the metal underneath and the two metals become inseparable by a mechanical process. Pyro plating is specially adapted for iron and steel goods, but is not suitable for other purposes. Its uses are, therefore, limited.

Close plating, which is also allied to Sheffield plating and has now been carried on in this country for about 200 years, is used for coating harness and carriage fittings. It consists in coating the iron or steel articles with a thin sheet of standard silver, brass or other metal. It is secured to the iron by previously tinning it and then passing a hot soldering iron over the sheet covering the metal. The surface is finally burnished by the usual method.

In the year 1838, when electro-plating was introduced for the first time, the new method quickly became very popular and soon superseded Sheffield plating. Modern Sheffield plate made by electro-depositing silver on copper articles, has a thinner coating of silver than that of old Sheffield plate. One sure indication of Sheffield plate is bands consisting of narrow strips of silver wrapped round the edges and the mounts, such as handles and feet, made of silver stampings. Articles of old Sheffield plate, such as trays and similar articles, had the backs coated with tin. This was accomplished by heating the articles to the melting point of tin and then distributing the tin over the surface, using a suitable flux such as zinc chloride. No tin backs or tinned linings are found on modern Sheffield plate. Another evidence of the genuineness of old Sheffield plate is the rough or unfinished edge. This is due to the fact that soft solder was always employed in making up Sheffield plate. The mounts were also filled with soft solder. The principal use to which Sheffield plate is put at the present time is in the manufacture of reflectors—the rolled bimetallic sheets being cut into circles and then spun or stamped into the desired form.

Various articles of Sheffield plate have now become very valuable. When snuffer trays became obsolete towards the middle of the last century they became converted into inkstands and some of these articles of old Sheffield plate now realize £4 each and upwards. A beautiful Sheffield plate wine cooler just fourteen inches in height, with two handles and vine leaf decoration, is to be found in South Kensington Museum. It would realize as much as £25 if put up for auction.



SPECIMENS OF SHEFFIELD PLATE.

Within recent years electro-plating has increased so enormously and the demand for such articles become so great that there are now as many as 170 electro-platers in Sheffield and over 100 in Birmingham. The export of silver plated and gilt wares from this country for the year ending 1906 amounted to £600,000. It is estimated that some four or five employees are required in many hotels for the purpose of cleaning over 5,000 spoons and forks daily.

The business of replating is a growing trade considering the vast quantity of plated goods in the market, and most of these goods require re-plating sooner or later. When replating old Sheffield plate the silver is stripped off in an acid solution. The article is usually scoured by hand instead of polishing it on a lathe and the scouring is done by means of hard brushes and sharp sand or pumice powder. When a higher degree of polish is required wheels or discs composed of layers of calico are used, to which lime is applied instead of sand. The lime is carefully burned and placed in air tight jars until required for use.

During the last few years numerous experiments have been made for determining some practical method of rendering silver less tarnishable. Amongst other investigations there has been the method of deposition by simple immersion, the electro deposition of various metals such as tin, zinc, cadmium, chromium on the silver surface with the object of rendering it less tarnishable and then baked in hot air or high melting point waxes so as to cause the silver to absorb the thin film of deposited metal. Another process is to subject the silver coated with these metals to pressure under various conditions and also electro-depositing on the silver surface under pressure. The method of making various amalgams and applying these to the silver surface and then driving off the mercury by heat has also been adopted. Some of these tests have given promising results in the laboratory, yet when put to a practical test have been found unreliable.

From an economist's point of view electro-plate offers

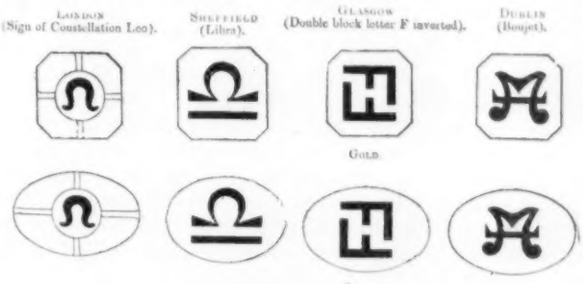
SPECIMENS OF SHEFFIELD PLATE.

many advantages over Sheffield plate on account of the metal of which the objects are made being much harder than the copper which is used for Sheffield plate. Electro-plated objects are, therefore, much less liable to be bruised and dented. When the silver becomes worn off in patches on electro-plate the contrast of color between the copper nickel alloy and the silver is not so apparent as between the copper and the silver in Sheffield plate.

England still continues to take the lead in this important industry, but although the art of electro-plating has attained considerable perfection much remains to be done by the electro-chemist. Unfortunately in many large establishments a large percentage of the articles manufactured require to be replated or doctored before they are fit to place upon the market. Electro-chemistry is, however, taking an important place in several branches of industry and the Faraday Society, which was established for the purpose of promoting the study of electro-chemistry and electro-metallurgy, is increasing its importance and membership, but at the present time a great crudeness exists in the electrical applications used in several large electro-plating works.

BRITISH HALL MARKS.

In our issue of April, 1907, we presented a very comprehensive article covering the hall marks in use in Great Britain. As the hall marks for foreign plate have been slightly altered from those shown in the article referred to, we now present those last adopted in the accompanying engravings. As explained in the Foreign Plate Act of 1904, when any plate from a foreign part is brought



BRITISH HALL MARKS.

to an assay office in the United Kingdom to be assayed, stamped or marked, it shall be marked in such manner as to readily distinguish whether the article or plate was wrought or made in England, Scotland, or Ireland, or was imported from foreign parts. The hall marks particular to the assay offices of London, Sheffield, Glasgow and Dublin are shown in the drawings, which, together with those presented in the issue above mentioned, make the representation of the foreign hall marks complete.

ENGLISH METHOD OF GILDING THE INSIDE OF SILVER, CUPS, PITCHERS, ETC.

By F. J. Frost.

A bright light yellow is the only color which in England is considered real gold, most high grade jewelry being made of 22 karat, consequently in gilding such color is most desired.

The inside of the article is first struck up with silver solution to a nice white color, which is not scratch brushed, but after rinsing in hot water is given directly to the burnisher. The burnishing is done by women and girls who hold their tools straight up and down and place the work on the bench before them instead of having a peg projecting from the bench, as we do in the States. While they cannot compete with the average burnisher of this country, their work is excellent and quite rapid, and their pay from 5 to 10 shillings a week; some very expert get as much as 15 shillings a week, about $3.75.

After burnishing, the article is flashed with a weak pure gold cyanide solution used hot, the nearly bright gilt surface being given a finishing touch by wiping off with a soft chamois cloth, this being done, of course, after the exterior surface of the article has been rouged up and washed out.

Prof. Burgess has described a process for the electrolytic stripping of brass from iron, by means of which superfluous brass may be stripped from parts of bicycles and automobiles and other work which has been subjected to the brazing process. Silver can in the same way be recovered from old articles submitted for replating, and from suspension rods, hooks, and baskets used in the process. Files clogged with brass, copper or lead may be cleaned by this means, and the coating of tin or tinned iron may be recovered. It remains for science to invent, and for the electroplating industry to apply, a satisfactory electrolytic process for stripping nickel from iron.

DEPOSITING BRASS UPON SMALL ARTICLES.

By Charles H. Proctor.

I have received from Germany an inquiry as to method of plating small articles in this country. It may be that the following will prove interesting to some American platers:

The method followed in the United States for depositing brass upon small articles, such as cigar box nails, rivets, safety pins and other little pieces is with the aid of the plating barrel, or in a regular plating bath with woven wire baskets. The sides and ends are made of celluloid, hard rubber or hard wood, or some other non-conducting material. The bottom of the basket is made of woven brass wire of sufficiently small mesh that the articles will not pass through. Heavy conducting wires should lead from the woven wire in the shape of hooks or supports to hang the baskets upon the negative pole while the depositing is being done. The following formula should be used for the bath:

Water	25 gals.
Cyanide of potassium, 98 per cent.	25 lbs.
Carbonate of copper	10 lbs.
Carbonate of zinc	5 lbs.
Carbonate of soda	4 lbs.
Ammonia water, 26 per cent.,	2 to 3 pints.

A voltage of not less than 6 should be used with a good amperage.

The articles may be cleaned by tumbling in carbonate of soda water after the regular tumbling has been performed.

A form of a tumbling barrel may be used made up of wood, and rotated slowly. The negative conductors should be small strips of copper. On the outside of the barrel are two copper bands. Provision is made by incisions in the barrel to make connections with the anode and the conductors in the baskets. The current is taken by the copper bands by spring contact strips, and thence to the anodes and cathode or basket. The time of deposit should be from 20 minutes to half an hour.

An angle barrel will be found the best and it should be of such size as to plate from 50 to 100 pounds at each immersion.

NICKEL AND COBALT.

A report by Frank L. Hess to the U. S. Geological Survey states that while the United States is rich in almost all of the useful metals, it does not produce nearly enough nickel, cobalt, or tin for its own consumption, and there seems to be scant promise that it will do so from any of the deposits now known. During 1906, as for a number of years past, this country imported much more nickel, mostly in the form of matte, than it consumed, so that large quantities of the refined metal were exported. The supplies continue to come in from Sudbury, Ontario. Considerable quantities of cobalt are produced at Cobalt, Ontario, as a constituent of the rich silver ores.

The ore is smelted at Copper Cliff, Ontario, and gives a partial silver recovery and a highly silver-bearing speiss, which is shipped to Camden, N. J., for further treatment. The ore is paid for at the rate of $30 per ton for ore containing 12 per cent. of cobalt and over, $20 per ton for 10 per cent. ore, and $10 per ton for 6 per cent. ore. A large smelter for the treatment of these ores is being erected at Trout Lake, near North Bay, Ontario, which is intended to have a capacity of 3,000 tons of ore a day.

The quantity of nickel in the cobalt ores is comparatively small and is not paid for.

There was no production of nickel or cobalt metal or matte during 1906 from the mines in the United States, but a small quantity of concentrates containing an unknown percentage of nickel and cobalt was produced at Comer, Oreg.

The uses of nickel are well known. Very large quantities are used in nickel plating; large quantities are consumed also in making armor plate, nickel imparting toughness and hardness to the steel. Considerable quantities are used in coinage, though the ordinary "nickel" of the United States coinage contains only 25 per cent. nickel, the other 75 per cent. being copper. Efforts, thus far unsuccessful, have been made to induce this Government to make a coin of pure nickel.

Much interest was aroused in the southern Appalachian States during the year by the apparently authoritative statement that deposits of cobalt were to be found in these States. Veinlets of titaniferous iron, carrying some cobalt, have been found at a number of places, but so far no considerable deposits have been developed.

Cobalt is used mostly in the form of the oxide, largely for coloring purposes; but this use does not create a large demand.

THE ZINC INDUSTRY IN BRITISH COLUMBIA.

Consul L. E. Dudley, of Vancouver, states that the Canadian government recently published the report of a commission appointed to investigate the zinc resources of British Columbia. In regard to this report the consul says:

"The conclusions drawn are that although the zinc industry is yet in its infancy in British Columbia, it is capable of great development. While several of the mines now being worked are essentially zinc mines, there are some silver-lead mines in which zinc blende is found in considerable quantities. Until recently the zinc in the silver-lead ores was regarded as an impurity to be gotten rid of by the easiest and cheapest means possible. The increased demand for zinc of late has made valuable as a by-product this zinc blende, which was formerly a troublesome impurity. The commission regards 15,000 tons of zinc ore of 50 per cent grade as a liberal estimate of the present annual production of the Slocan district, and it is calculated that the Ainsworth district can produce 100 tons daily of 50 per cent ore. There are many mines and prospects in other portions of the province which are supposed to carry zinc in paying quantities. A zinc smelter has been established at Frank, Alberta, the plant being close to a coal mine and on the route from the mines to the market. The large amount of fuel required in reducing zinc ore renders it necessary that coal shall be near the smelter. Coal can be delivered at the Frank smelter at less than $1 per ton."

Dr. N. S. Keith was confronted with a problem in the electrolytic refining of lead base bullion. His solution of lead acetate and lead nitrate became decomposed, with the formation of insoluble salts which interfered with the deposition. The problem was finally solved by substituting for the original bath an electrolyte composed of lead sulphate dissolved in sodic acetate. Dr. Keith avers that the integrity of this electrolyte was preserved indefinitely, that the salts gave no further trouble, and that equal amounts of lead were deposited at the cathode and dissolved from the anode. The extension of such studies as this to electroplating is what the industry needs.

When it is remembered that copper is essentially the great factor in a well composed brass bath, which consists largely of this metal, and that zinc is withdrawn very slowly, the bath should be regulated with copper.

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE NON-FERROUS METAL INDUSTRY.

FURNACE FOR MELTING PLATINUM.

For a long time there has been a demand for an easy and rapid method of melting small quantities of platinum. The long used lime method is crude, uncertain and sometimes very wasteful of metal. In that process the lime is first shaped and then allowed to dry in the air. Cracks are almost certain to appear in the walls and even when they are exceedingly small, perhaps not visible to the unaided eye, they are certain to make trouble when the platinum begins to melt. These cracks are sure to

FURNACE FOR MELTING PLATINUM.

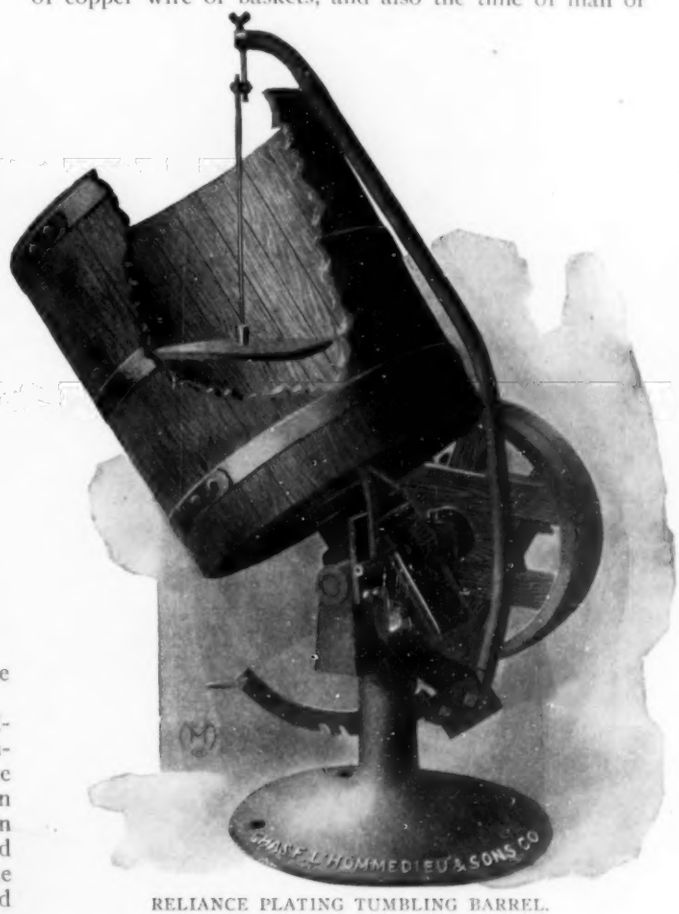
open and permit the molten metal to escape, with the result that more or less is wasted.

In a new furnace designed and built by L. & M. Wollstein, of 16 John street, New York City, the disadvantages of the old method are removed. In the new furnace a crucible made of very refractory material is used in connection with a gas furnace. The innovation is not in the adoption of crucibles of this character, but is found in the manner of using them. The furnace carrying the crucible is placed centrally in a table which can be moved freely around a vertical axis by hand. A Bunsen flame is first directed upon the outside of the furnace and after this has been brought to a red heat, the gas flame is shut off and the flame from an ordinary oxy-hydrogen burner introduced vertically into the top of the crucible directly upon the platinum. As the metal begins to melt the table is moved back and forth to agitate the melting metal and insure an even heating throughout the mass. In melting under the usual conditions and with the usual appliances the platinum is very apt to come double—that is a portion of the metal is completely melted, while the balance of wholly or partially frozen. The result is an ingot which is sure to develop cracks when placed under the hammer or in the rolling mill. The new device obviates all these objections and insures a homogeneous product.

These furnaces are made in three sizes, the largest handling as high as 40 ounces of metal; the most desirable size is that intended for jewelers and will melt about 25 ounces.

THE RELIANCE PLATING TUMBLING BARREL.

The Reliance plating tumbling barrel, built by Chas. F. L'Hommedieu & Sons Company, of 99 South Clinton street, Chicago, Ill., is adapted for plating and tumbling small articles in one operation, thereby saving the cost of copper wire or baskets, and also the time of man or



RELIANCE PLATING TUMBLING BARREL.

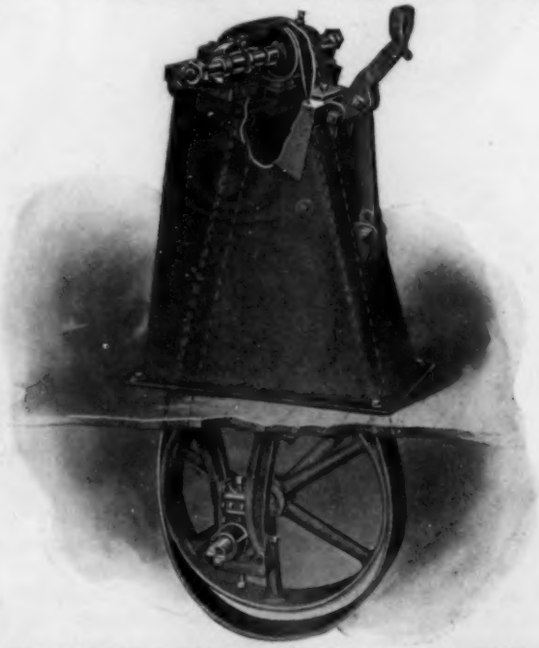
boy in stringing the work to be plated. A uniform deposit of metal is also obtained on each piece of work. These barrels are on a low base, thereby making it easy for boys to operate them. Another advantage is in the fact that the barrel can be tipped at three angles and dumped by the pressure of the foot. If desired the work may be scooped out. Used with the barrel is a special anode (nickel, bronze, brass or copper), with which it is

claimed much better results can be obtained than by the use of other anodes. This anode is supported by a rod and can be lowered or raised to any height. With each barrel is furnished a tight and loose pulley 20 inches by 3 inches face.

THE WHITNEY GRINDING AND POLISHING JACK.

The Whitney jack, manufactured by the New Britain Machine Company, of New Britain, Conn., is a polishing, buffing and grinding machine designed on radically new lines. Its construction will be readily understood from the two engravings accompanying. With the belt pulling the shaft down into the bearings, a steady, true running wheel is assured. It is possible with this construction to entirely enclose the belt to keep oil and dust from it, and to greatly increase the healthfulness of grinding, as the belts in this design do not set up air currents and carry loose particles of emery around the room for the workmen to inhale.

WHITNEY GRINDING AND POLISHING JACK.



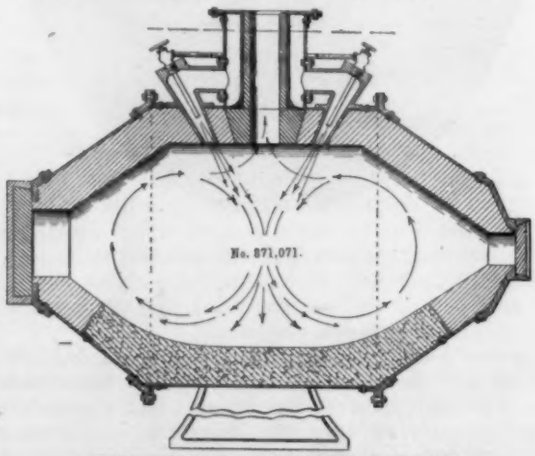
SHOWING SPINDLE PULLEY RESTING ON BRAKE, BELT RELAXED FROM DRIVING PULLEY.

A single movement of the self-locking lever starts the machine in motion and on releasing the lever the spindle and wheels are brought to rest instantly by contact with a self-acting brake. When the spindle is stopped the belt is at rest and relaxed, being slacked away from the pulley. This adds to the life of the belt and relieves the pressure on the bearings of the jack and on the line shaft below. The belt can readily be reached for examination and provision is made to tighten it without relacing. A special carbon steel is used for the spindle, and a form of thread not apt to fill up with emery is cut on the ends, which are fitted with right and left nuts where a double end spindle is used. The spindles are carried in a novel form of self-aligning box with a three-point-of-support bearing. The liners may be easily reached or cheaply renewed and are quickly adjusted to take up all end thrust. Lubrication is most thoroughly provided for and the same oil is used over and over. The construction is such that the faster the machine runs the greater is the supply of oil to the boxes. The machine weighs 400 pounds, has a base 28 x 13 inches, and the height to the center of the shaft is 33 inches.

NEW SCHWARTZ MELTING FURNACE.

Letters patent granted to Edward H. Schwartz, and by him assigned to the Hawley Down Draft Furnace Company, of Chicago, Ill., describe a new method of melting and treating metals and other substances. The furnace is cylindrical in general outline, the ends being conical. The furnace chamber is lined with fire brick and has a top outlet for the flames and products of combustion, and a charging opening at one end and a pouring opening at the other end. The furnace is intended to rock or oscillate.

Through the top of the furace project two burners which are inclined toward each other in such manner as to direct into the furnace chamber flames which meet at the central point of the chamber. From this arrangement of the burners and from the shape of the furnace, there result two rotary flames on either side of the central vertical axis. After the flames meet, the single flame then formed is directed squarely toward or against the bottom of the furnace, substantially at right angles thereto, and there split into flames, owing to the striking of the hearth or the material thereon, and also owing to the upwardly curved character of



NEW SCHWARTZ MELTING FURNACE.

the ends of the hearth. The flames then circle upwardly at opposite ends of the furnace chamber and being deflected by the upper walls of the ends, are doubled back and forced to make complete circles and strike the hearth before obtaining exit through the outlet.

The material to be melted is introduced into the furnace, after a preliminary heating, and the burners are then started, with the result that the rotating flames rapidly melt or reduce the material in the furnace. During this period the charging and pouring openings are both closed. At the proper time the furnace is tilted and the molten metal poured out.

AUTOMATIC POLISHING.

Automatic polishing is no longer a proposition of uncertainty, but an established present-day method already practically applied to work which was, until a few years ago, considered a permanent stumbling block to all automatic devices. As one of the most prominent instances of the present-day use of automatic polishing machinery we illustrate herewith machines for the polishing or buffing of iron or brass tubing or flat surface work. These machines are manufactured by the Robinson Automatic Machine Company of Detroit, Michigan, and are shown in operation at the plant of the Michigan Stove Company, said to be the largest stove factory in the world, and the Jenks & Muir Manufacturing Company, whose prominence in brass bed manufacturing is well known. These machines are said to have completely revolutionized the old hand method of metal polishing and their practicability has been conclusively demonstrated.

FIVE-WHEEL ROBINSON AUTOMATIC TUBE POLISHER IN OPERATION AT THE JENKS & MUIR MFG. CO., OF DETROIT, MICH.

While the accompanying illustration shows a ten arm machine with ten polishing wheels especially designed for stove plate work, the Robinson Automatic Machine Company are the makers of other special types of machines to meet various requirements and are prepared to design and construct special machines for irregular or special work.

We are informed that the Michigan Stove Company lost two of these machines in the great fire which destroyed their plant in January last and immediately ordered two new machines, thus indicating that their experience during past years conclusively demonstrated to them the economy and necessity of automatic polishing machines in any first class polishing department. It is estimated by the manufacturers that one of the eight wheel flat surface machines will do the work of twelve polishers in one day and produce uniform surfaces, so hard to obtain with the old hand method.

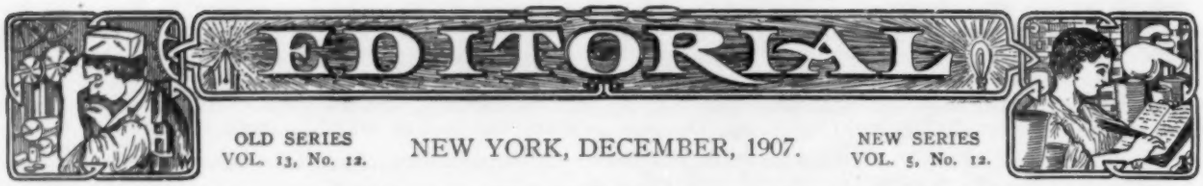
Only one operator is necessary for each machine and a set of follow boards or carriages for the work to be polished can be made by an ordinary carpenter at a trifling cost.

The tube polisher illustrated herewith has a capacity of 2,500 feet per day and can be adapted to work of any diameter and from 2 inches to 8 feet in length. Every inch of surface is perfectly polished by the machines, as the tubing revolves in its holders and is simultaneously moved in a horizontal direction, passing beneath all the wheels of the machine at an angle of 30 degrees, the same as with hand work.

In both of these machines all bearings are babbited and readily accessible for re-babbiting, and all wearing parts constructed of special materials of the highest efficiency.

Either of these machines can be operated by belt or other transmission or direct connection. The speed of the carriages for the work is easily regulated. All machines are belted complete ready for driving power and installed under the personal supervision of one of the expert operators of the company, who remains after power is applied to establish the machine and equipment in perfect working order. The simplicity of the construction of the machines and the thorough manner in which they are built insure their efficiency.

10-ARM ROBINSON AUTOMATIC POLISHER IN OPERATION AT THE MICHIGAN STOVE COMPANY.



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CONTENTS

THE IMPROVEMENT IN BUSINESS—OUTLOOK FOR 1908.

The assertion is frequently made that the daily newspapers and the trade journals are taking too cheerful a view of the business situation and are withholding some of the actual facts and only printing the good news. The assertion has also been made that where there is a political reason the papers have made the business situation much worse than it actually is. THE METAL INDUSTRY herewith records some facts from Dun's Review, which, being an authority on business conditions, can be taken as reliable. We also print two opinions from two of our advertisers, one a large metal house in New England, the other an extensive manufacturer of machinery in New York. It will be noticed that both Dun's Review and the parties quoted take a cheerful and comprehensive view of the situation.

Dun's Review states that the failures in the United States for November show a decrease of about $10,000,000 in liabilities as compared with those of October. The actual failures reported were 1,180 in number, and involved $17,637,011 of defaulted indebtedness. Although these figures show an increase as compared with the same month of last year, they are smaller for any monthly period since the financial and business situation became acute and in the amount of defaulted indebtedness are smaller than of the September showing. "The mortality was greater than normal," says Dun's Review, "owing to the strained monetary situation and not because of poor business, and a comparatively few large failures in the manufacturing division supplied the only increase above an average month's liabilities." "Comparison with last year's figures at this time is much less significant than the great improvement that is shown over the losses of the preceding month."

This is indeed cheerful news and corroborates the statements of THE METAL INDUSTRY last month that industrially the country was strong, financially it was weak. We herewith have the pleasure of recording the views of the two firms mentioned above on the outlook for 1908, both of which firms are directly interested in the welfare of the metal business:

"In regard to the outlook of 1908 we see nothing encouraging and believe business will be very quiet, but in our opinion this is to be desired as we are just emerging from a period of over-expansion and over-extravagance, which has resulted in a temporary paralysis of credit, and if the business world is allowed a year or two of quiet it will undoubtedly recuperate and the foundation will be laid for an era of good times, two or three years hence, when it is to be hoped

that our so-called "Captains of Industry" and "Captains of Finance" will be satisfied with a slower and less spectacular, but surer, progress than in the past."

"Relative to the prospects for trade for 1908, I would say that we are unable as yet to form any opinion as to the future. We are running full on old orders, with about the nominal amount of inquiries for new work, but with less orders than last year coming in. Everything seems to depend upon the straightening out of the financial muddle. If that is straightened out to the satisfaction of the public, with the crops as they have been this year, more than average, and prices far beyond average high, there should be lots of money to be spent during the next year, particularly as the railroads, which are crowded to their limit in transportation problem, have been holding up their orders for a little while, and it only takes a small comparative amount of extra orders on their part to entirely change the market conditions of machinery and metals, they being by far the heaviest line of consumers."

RAISING WAGES TO INCREASE OUTPUT.

Those who have looked into the matter, even in the most cursory way, must have been impressed with the utter lack of system prevailing in the average small brass foundry. Jobbing founders employing two or three molders have no conception whatever of the details of their own business, and the records, if any are kept, deal with the income and outgo in the aggregate only, and never by items. The cost of raw materials and supplies is kept because they must be paid for, but no record is made of the work in the foundry, and this particularly applies to the mixtures and the use of scrap, gates, etc. Duplication of alloys is a matter controlled solely by the judgment of the workman—he makes a guess, which is generally wrong; occasionally he hits somewhere near the mark. The founder knows the output of his foundry in pounds, since that is necessary for billing; and yet he does not know whether the output is up to the full capacity or not. And the strange part of this is that the owner is a practical foundryman himself, and has risen through the ranks.

In the majority of cases the same absence of system is found in the brass foundry which is an adjunct of a large plant. Any dark, unused room is good enough for this purpose, and the more inconvenient it is, the better it seems to be adapted to the purpose. We all know this statement is not overdrawn, since we have seen such with our own eyes.

Very rarely, perhaps not one in fifty, can the small brass founder estimate on a job according to the price of copper. If the metal advances or declines he changes his prices to what he thinks about right; he has no method of calculating exact charges according to metal prices; he guesses and appears to be satisfied if he can get a living out of the business. He may think he is on the road to a competency, but millionaire brass founders are as rare birds as the famous dodo.

Items of as much importance as cost of materials are those of wages and output per man. Every dollar put into the business ought to return just so many pounds of castings, but when the management is not familiar with the details of the work it is difficult to get the maximum output. A correspondent whose letter is printed in another department has reached this stumbling block in his experience. Having a well equipped foundry he is satisfied he is not getting as many pounds of castings per day as he should, and is seeking a remedy. Raising wages with the expectation that men will respond and show their appreciation by a correspondingly greater effort and consequent output, has often been tried and about as often has failed. The vast majority of the human breed, working for specified wages, are imbued with the belief that they are already earning more than they are paid for, and an increase in the stipend is taken without any deep feeling of obligation to put forth greater endeavor to earn the increase. They think they deserve the advance, otherwise it would not be given them. Taking men in groups or collectively this plan would not be satisfactory; but with the man as an individual it would work all right. A single man is grateful, but many men are not. This item in the makeup of a man was recognized thousands of years ago, and human nature has not changed much since.

If we are correct in our premises and our friend's melter and molders are not abnormal creatures, increased output will not follow increased pay. As stated in our reply it would be better to place the foundry on a premium plan and pay for work done. This is common practice and it has the grand advantage of nearly eliminating the lazy and incompetent man.

RESULTS OF TESTS OF BRASS CASTINGS WITH AND WITHOUT A SMALL PROPORTION OF ALUMINUM.

THE METAL INDUSTRY and the former *Aluminum World* have shown the results of the addition of aluminum to brass, which addition is generally conceded to be advantageous to certain mixtures, but not to castings which are to stand pressure. Recent experiments and tests by a chemist with castings which did and did not contain aluminum gave the following results:

Grade of brass, 66% Cu. 33% Zn.

PURE BRASS.

Diameter.	Area.	Breaking Tension Per sq. in.	Quality.
.493	.1908	24,700	Oxide
.490	.1885	33,300	Cold shot
.490	.1908	37,650	
.489	.1878	30,300	Oxide
.495	.1924	24,750	"
.490	.1885	41,300	"
	Average	32,000	

BRASS WITH 1% OF ALUMINUM.

.488	.1870	34,400	Good
.488	.1870	32,100	"
.492	.1901	36,400	"
.493	.1908	33,300	"
.489	.1878	33,600	"
.490	.1885	34,100	"
	Average	33,981	

CRITICISM AND COMMENT

WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

THE OUTPUT OF A BRASS FOUNDRY.

To the Editor of THE METAL INDUSTRY:

We are desirous of obtaining data dealing with the products that should be obtained out of a brass foundry. We have in use four old style fire brick lined furnaces—that is, our furnaces are lowered into the ground, the top being flush with the foundry floor. These furnaces are constructed to receive Nos. 40, 60 and 80 crucibles; the stack is about 16 inches in diameter, 40 feet high. There is no complaint regarding the melting of the metal, requiring only about 2 hours to melt an 80-pot. The material we use is scrap copper wire, heavy red brass and some sheet copper, but very little light yellow brass; in fact, the class of scrap material we use is said to be first class. We draw these pots by means of chain and block suspended from an overhead trolley. The nature of our castings varies from plain heavy engine side rod bushings to very small jobbing work. The output of our foundry heretofore has been an average of 300 pounds per day and the average weight of castings about 10 pounds. We employ 2 molders, a furnace tender and labor to cut the castings off the gates and grind the same.

With these conditions before you, we should be glad to have you advise us if we are correct in believing we are only producing about one-third of what we should under the circumstances. U. I. B.

October 30, 1907.

From your description we are of the opinion your arrangements for melting brass are very complete for a foundry of the size mentioned. If you are not saving your skimmings, ashes and foundry tailings, or are disposing of them to junk men, you might possibly affect some economy along this line. The materials you use for making your brass we consider first class. Possibly you could make a saving by adopting mixtures that do not contain such a high percentage of copper and could add larger percentages of zinc and lead, and thus reduce your cost.

You are entirely right in supposing you are getting only about one-third of the output of castings from your foundry that you should. It is very evident your men are not exhausting themselves in turning out castings, and it would be a most diplomatic proceeding to so change your methods as to secure their hearty cooperation. The premium system of work has been successful in other brass foundries, and it might be applied to your molders and possibly to the grinder. By this plan the men are paid for the work they actually produce, and the more they earn the more castings you have. We do not know what you pay, but if you are paying the regular foundry wages for your section, then raising the wages would not accomplish the object. Paying for work actually done would, we think, best suit your conditions.—Editor.

It is estimated that seven-eighths of the dividends of the principal diamond mines of Cape Colony are payable outside of the colony and that $9,400,000 is spent yearly in wages in Holland preparing South African diamonds for other markets.

AN ANALYSIS OF "BASSITE."

To the Editor of THE METAL INDUSTRY:

I suppose you have heard of the new substitute for tin called bassite? If not, you may gain some information from the copy which I am enclosing. As an instance of metal faking this seems to me to be a good one. Our analysis of this material shows

Copper	27.84	per cent.
Lead	.49	" "
Zinc	70.81	" "
Iron	.70	" "
	99.84	" "

I cannot see where all the usual properties claimed for this material can possibly be derived from such a mixture.

As the practice of your journal has always been to publish the truth and nothing but the truth, I thought this matter would be of interest to you.

Detroit, U. S. A., Nov. 13, 1907. W. M. CORSE.

CYANIDE OF COPPER SOLUTIONS.

To the Editor of THE METAL INDUSTRY:

Having read a good many articles in THE METAL INDUSTRY about brightening cyanide of copper solutions by adding bisulphite of soda from time to time I find that by adding a few ounces of sulphide of potassium, dissolved in a quart of hot water, to the cyanide of copper solution, it will clear away that reddish streak and deposit a clear copper color on the articles. I don't know if any of your readers have tried this, but I think it will be found much cheaper and it does not overload the solution with soda salts. Care must be taken not to get too much in the solution; about 2 ounces per 50 gallons will be enough—only add it until the solution plates clear. I have plated nickel plated zinc articles for gun metal finish and they came from the solution as if plated with the sulphate bath, only they are not that satin finish color but a fine pinkish red.

November 6, 1907. FRANK DUFFY.

NEW BOOKS.

TIN ROOFER'S HAND BOOK. The National Association of Master Sheet Metal Workers of the United States have prepared this booklet of 24 pages for free distribution to those interested in the subject of tin roofing. It is intended particularly for the instruction of roofers, sheet metal workers and their apprentices. It first gives a brief history of tin plates and their use for roofing purposes. Then follows a discussion of the advantages of a good tin roof over other materials employed as roof coverings. Next comes the standard specifications adopted by the association, and the final pages are taken up with practical hints for the roofer.

Some operators use anodes of copper constantly in their brass baths, adding zinc when necessary to maintain color. This is good practice, for with an anode surface of all copper the plater can make no mistakes as to the metal necessary to produce the desired color.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

Q.—Kindly give me the formula for an alloy that will make a nice red skin brass casting that will be steam and water tight and when dipped in acids will come up a nice clean red. It must be soft for machining.

A.—We think the following composition will meet all the requirements you desire:

Copper	87
Tin	5
Zinc	5
Lead	3

J. L. J.

Q.—I would like to know how to mix lead and copper up to 30 per cent. or more. I have tried all ways I could think of, mixing hot and cool, and starting with a small per cent. of copper, but it would still sweat out on the bottom side. We want a friction metal with as much lead in as we can keep from coming out.

A.—It is necessary to have in your mixture some metal having a high melting point, that will cause the molten metal to set quickly, before the lead has a chance to separate. About 2 pounds of nickel to the hundred will keep the lead from separating.—J. L. J.

Q.—(1) I would like to know about the deoxidization of brass and bronze alloys. (2) I would like to try pure metallic magnesium. (3) I want a good book on melting bronze metals. (4) I send you two samples of bronze from two separate heats of the same mixture. What causes the trouble?

A.—(1) The principal deoxidizers for brass and bronze are phosphorus, phosphor-copper, phosphor-tin, silicon-copper, manganese-copper, aluminum and magnesium. (2) Magnesium may be obtained from C. W. Leavitt & Company, 220 Broadway, New York. (3) Brass Founders' Alloys, by J. F. Buchanan, is a good work on brass and bronze which we can send for $2. (4) The sample of bronze marked A has a rather coarse grain and the fracture shows some oxide spots, while the second sample has a close fine grain and shows less evidence of segregation. In order to get the best results it is not only necessary to use good materials, but also to thoroughly alloy them and then to pour at the proper temperature. The use of one-third or more remelt will give your metal a better grain. Pouring too hot gives the metal a long time to set and a coarse fracture and a weak, segregated metal will invariably result if the casting is other than a very small one.—J. L. J.

Q.—What is the best proportion of metals to cast bronze anodes a shade darker than the sample sent you?

A.—For anodes somewhat darker than sample use 90 parts copper and 10 parts zinc. Cast anodes are preferable.—C. P.

Q.—We have quite a large amount of tin dross which we cannot reclaim with a regular furnace for melting down this material. We would like to know how to do it without burning the metal.

A.—Run the dross through a fine sieve and mix the fine particles with sawdust. Then feed this mixture a little at a time into a bath of melted tin. The coarse shot and splatters need not be mixed with sawdust, but may be added directly to the kettle. The contents of the kettle should be refined by boiling up with a green hickory pole. A regular reducing furnace, which would cost about $900, would, of course, do the work more efficiently.—J. L. J.

Q.—Kindly advise us how to make the so-called white metal used for making patterns. Also how to prevent the core sand sticking to the core boxes, which are of brass and iron.

A.—For white metal we would advise you to use a mixture of 50 parts zinc and 50 parts tin, and flux with sal ammoniac. The reason the core sand sticks to the core boxes is because there is too much flour in it. A core made from oil or rosin and containing some silica sand would give better results with brass than can be obtained with flour as a binder.—J. L. J.

Q.—We have difficulty in remelting German silver scrap into fittings, to get just the right temper.

A.—First run the metal down into ingots and then add 8 ounces of zinc and 2 ounces aluminum to each 100 pounds of scrap and then remelt; the castings will come out all right.—J. L. J.

Q.—What is common tin foil made of? I particularly want the percentages of the mixture.

A.—Tin foil such as is used for tobacco wrappers consists of about 97 parts lead and 3 parts tin. Some years ago an alloy of 50 per cent. lead and 50 per cent. tin was used, but owing to the high price of tin this metal has been gradually reduced. Tin used for candy wrapping is very nearly pure tin.—C. P.

Q.—Can you give us the formula for Damascus nickel bronze; if not, would be glad to have the formula for any good nickel bronze.

A.—The following formula gives a good nickel bronze:

Copper	72	lbs.
Lead	22½	"
Tin	4½	"
Nickel	1	"

I. L. J.

Q.—Can you furnish the formula for making amalgam? and also give me a 15 karat gold solder.

A.—In preparing amalgams of gold 2 parts mercury to 1 part gold are used. The mercury should be placed in a small crucible using a Bunsen flame. When the mercury is quite hot, the gold, in small pieces, should be added and stirred with an iron wire. The amalgam should be poured into cold water and the excess of mercury squeezed out with the fingers. The amalgam is then ready for use. A 15 karat gold solder should consist of 9 parts fine gold, 2 parts silver and 1 part copper. A more fusible solder consists of 12 parts gold, 7 silver and 3 parts of copper.—C. P.

Q.—Kindly give us the best formula for making aluminum mine car wheel patterns.

A.—We would advise that pure aluminum is very satisfactory and lighter than any of its alloys with the more common metals. In heavy sections, however, it may give trouble, due to its great shrinkage. A good alloy is made from aluminum 98 per cent., and zinc 2 per cent. The zinc is added by means of a 10 per cent. zinc, 90 per cent. aluminum hardener. For this purpose the Aluminum Company of America, Pittsburg, Pa., recommend the use of their No. 12 aluminum alloy, which is used quite extensively as a pattern metal in iron and steel foundries.

PLATING AND FINISHING.

Q.—Will a soft tar lining hurt a nickel solution?

A.—Coal tar is not a satisfactory lining for a nickel tank as it never gets hard and there is always an oily scum on the surface of the solution. To line a tank procure a block of asphaltum from some roofing company; melt this in any old iron kettle and add 1 part of coal tar to 3 parts of the asphaltum. Level up your tank and begin by first covering the sides, using a strip of wood across the tank to prevent the mixture running out. By adjusting this you can line your tank any thickness from 1/16 to ¼ inch thick. Allow each side to cool before doing the other. Coat the ends and lastly the bottom. This mixture can also be brushed on; it gets hard as soon as cold.—C. P.

Q.—(1) Will you give me the formula for oxidizing brass or bronze kick plates, that will not require current or plating. (2) Also solutions for oxidizing solid copper kick plates as above stated. It must be no Jap-a-lac or paint.

A.—(1) We are of the opinion that you will be unable to obtain satisfactory results unless you remove the kick plates from the doors. They are usually lacquered and the lacquer must be removed before any oxidizing process can be used. You might try brushing a solution of sulphuret of potassium, 2 ounces in each gallon of water and used hot, for the bronze. For brass dissolve acetate of copper in carbonate of ammonia and apply in the same manner. For antique effect use a piece of felt and powdered pumice stone; dry well and lacquer. (2) The copper could be cleaned with a dilute solution of hydrochloric acid, wash carefully and when dry apply boiled linseed oil, to which has been added some solution of hydrosulphuret of ammonia; this will give a pleasing color and will improve with age.—C. P.

Q.—I am using hot cyanide of gold solution. After adding chloride of gold sometimes my solutions will not plate all over; the high parts will take the gold while the low parts will not take any gold at all. My work is chemically clean.

A.—The conductivity of your solution is poor or the trouble you mention would not occur. Add a little bisulphite of soda when making additions of chloride of gold to your bath; this will overcome the difficulty. Avoid adding too much cyanide; this is a frequent cause of trouble in all cyanide baths.—C. P.

Q.—Some time ago I wrote you about a dip for plate; you advised me to try aqua regia. I tried it and it seemed to eat the gold and brass too quickly. Please tell me the cause of the trouble. What are 14 gold karat gold anodes?

A.—Add water until the action of the acid is not so rapid. This will probably help you. Fourteen karat gold anodes consist of 14 parts fine gold, 7 parts copper and 3 parts silver. To prepare a solution you have to cut down the alloy with some aqua regia (3 parts muriatic and 1 part nitric acid). Then evaporate to get rid of the excess of acid and then dissolve the chloride of gold alloy in cyanide of potassium. The solution should be made up of ½ ounce gold, 2 ounces of cyanide and about ¼ ounce bisulphite of soda in each gallon of water. Use the solution hot.—C. P.

Q.—Would like to have a good formula for a bronze solution.

A.—See paper read by Charles H. Proctor before the American Brass Founders' Association and published in The Metal Industry last June. By preparing a copper solution first and then adding a slight amount of zinc a bronze solution can be readily produced.—C. P.

Q.—Will you let me know how to get a white nickel on brass? My nickel is a blue color, my solution stands 5 Baume.

A.—Your nickel solution is low in metal. Add 2 ounces single sulphate of nickel and 2 ounces of common salt to each gallon of solution and you will have a deposit white enough for all purposes.—C. P.

Q.—Will you kindly give us the mixtures that will give to brass the same finish or color as the backs of cheap clocks. This is some kind of acid dip.

A.—You probably refer to dipped brass. The formula consists of the following:

Aqua fortis, 38%	1 gal.
Oil of vitriol, 66%	1 "
Salt	4 ozs.
Water	1 qt.

The acids are mixed some time before using, a crock being used for this purpose. The brass goods are freed from oil or grease in a hot potash solution, washed in water and then immersed in the acid dip for a few seconds; again washed in cold water, dried out with the aid of boiling water and then finished in maple sawdust. The articles are then lacquered to preserve the color.—C. P.

Q.—Is it possible to electroplate aluminum? If so, what is the latest and best method to use?

A.—On page 183, June, 1907, of The Metal Industry you will find an answer in regard to electroplating aluminum which may assist you somewhat. In plating pure aluminum cleanse your work first with benzine, then immerse in a dilute solution of hydrofluoric acid and water. Then immerse in a solution of nitrate of mercury instead of the oxide, as mentioned in the answer to our former correspondent. This is composed of the following: Water, 1 gallon; cyanide, 2 ounces; nitrate of mercury, ¼ ounce. When completely covered with mercury immerse for a few seconds again in the hydrofluoric pickle; wash and immerse in a hot copper bath of any good formula composed with bisulphite of soda, cyanide and acetate of copper, with an addition of 2 or 3 ounces of carbonate of soda to each gallon.—C. P.

Q.—We are desirous of installing weighing machines over our silver plating tanks for the purpose of weighing the amount of silver deposited on a cathode without taking it from the bath. Will you

kindly let us know the names of the firms manufacturing these scales. We understand they are used almost universally by firms plating knives, forks and spoons.

A.—Any reputable scale manufacturer could erect such an apparatus over your plating tanks. The weighing machines for the purpose mentioned are usually a combination of avoirdupois and troy weight, the first for the balance and the second for the amount of silver deposited. In Langbein's "Electro Deposition of Metals" (which we can send you for $4) there is a very good description, with drawings and details, of the Roselaur plating balance, one of the best that was ever devised.—C. P.

Q.—I am sending you a sample of mottled brass finish. Please advise me how this finish may be obtained?

A.—There are several ways of producing crystallized brass. Your sample was refinished by us in the following way: Prepare your work by polishing in the usual way, then cleanse as for plating. Then prepare a hot solution of equal parts of muriatic acid and water to which is added 4 to 6 ounces of sal ammoniac and 2 ounces of sulphate of copper to each gallon of the acid and water mixed. After cleaning as mentioned pass rapidly through the bright acid dip, wash and immerse in the above solution for a few minutes until the crystals are well developed. Then remove, wash and immerse in a cold solution of sulphuret of potassium and water, ¼ ounce to the gallon; this gives the dark olive green tone. Wash, dry out and lacquer. Another method consists in preparing a partly concentrated solution of bichromate of potash in hot water and adding muriatic acid equal to ¼ the weight of the potash used; then proceed as above. To produce a green finish upon brass or bronze first prepare a warm solution of ¾ pound of sulphate of copper and ¾ pound sal ammoniac to each gallon of water. Cleanse the work and acid dip it; then immerse in the solution for a few seconds until a dark olive green is produced; remove and allow to dry in the air without washing in water. This will be accomplished in ¼ to ½ hour. Now take a painter's 1-inch sash tool and a little of the solution, just enough to moisten the brush, and stipple all over the article. The green will appear. Allow to dry again and then pass rapidly through cold water, when a dense patina will appear. Drain well and dry in the air and then lacquer with a mixed gum and collodion lacquer and afterward wax. If a more bluish verde finish is desired proceed as above, but instead of stippling with the immersing solution prepare a solution of 1 ounce sulphate of ammonia in 1 pint of water and then proceed as directed. Kindly inform us of the results obtained by you.—C. P.

Q.—Will you kindly let me know the most satisfactory and quickest way to place white enamel color on chandeliers? We have used the ordinary white enamel with the brush, but find it a very slow process of drying and recoloring.

A.—For your purpose a white enamel made up with spirit copal varnish will be found more satisfactory. This enamel can be dried with the aid of heat upon the lacquer table and the second coat given in half an hour. This is known as white enamel cut in wood alcohol. Fusel oil will be found the best material to reduce it with, although the manufacturers recommend wood alcohol. To produce porcelain white with this enamel dissolve a little dry soluble blue in powder in a little fusel oil; mix a little of this with the enamel. This gives the bluish white tinge and prevents the enamel having a yellowish cast after having been put on for some time.—C. P.

Q.—Am sending you a couple of brass plated caps which were plated a full half hour and looked all right when finished. You will notice that the zinc has apparently absorbed the brass plate. Can you give me a remedy?

A.—On examination of the samples it does not appear to us that the zinc has absorbed the deposit. If this were the case the zinc would have a dead whitish aspect. We rather think there must have been a miscarriage of the current when these were plated, as the deposit appears infinitesimal and the final coloring must have cut through this. We have refinished these caps with a ten-minute deposit and then recolored them with a soft buff. These we afterward lacquered, toning the lacquer with gold color to produce a richer effect. The lacquer we used was French varnish cut in wood alcohol and thinned with equal parts of fusel oil. The coloring matter used was aurine aniline, or golden yellow dissolved in fusel oil, and a few drops of this added to the lacquer mentioned above. We would advise you to keep your content of the bath a little higher in copper, even if you have to use a little stronger current to produce a good yellow color; also avoid an excess of ammonia. If you are satisfied the zinc did absorb the deposit, by following the above method this may be avoided to a certain extent. We would ask you to keep these caps for a time and let us know the results.—C. P.

Q.—I am having trouble with small handles rusting after being nickel plated. They are made out of cold rolled steel. I give them a flash in the cyanide copper and then about twenty-five minutes in the nickel bath. In about two weeks spots of rust appear all over them.

A.—If you are using a sulphate of nickel solution this should not occur; if you are using a chloride of nickel solution, articles of iron or steel will invariably rust after a short time. If you use a plater's compound add from 1 to 2 ounces to each gallon of boiling water and boil for at least fifteen minutes after the regular wash in cold water or immerse for a short time after your regular method in benzine or kerosene. This should kill the moisture in the pores and prevent rusting.—C. P.

Q.—I am using a black nickel solution made as follows: 1 quart nickel solution of double salts—stands at 6 degrees—1½ ounce sulpho-cyanide and aqua ammonia enough to turn solution slightly blue color. I want to put deposit on so it will compare with the white nickel in thickness of deposit. The trouble I have is, before I can get enough on it will get so brittle I can scratch it off with my finger nail; but 10 or 15 minutes plate in the same bath is very good, but not heavy enough.

A.—We are of the opinion that you will be unable to produce a black nickel deposit as dense as a white nickel. This is due to the fact that the solution must be radically alkaline. Why do you not try putting on a 10-minute coat in the white nickel bath and then finish in the black nickel. Try adding about a pennyweight of benzoic acid to each gallon. If the color is not black enough add ¼ ounce sulphate of zinc.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.
TRANSLATED AND EDITED BY HOWARD GREEN BAYLES, MET. E.

EFFFECT OF COMPOSITION ON THE WORKABILITY OF BRASS.

Translated for THE METAL INDUSTRY from *Der Metallarbiter* by H. G. BAYLES.

In working the copper alloys into various shapes by stamping, drawing or bending, it is often found that the quality of metal first tried can not be subjected to the desired degree of distortion without breaking. To remedy this tendency the metal worker is offered two alternatives; to interrupt the working and anneal his piece, or to vary the composition of the metal in such a way that this will be unnecessary. Annealing means both added cost and delay. To alter the alloy intelligently the worker must have clear ideas as to the effect that may be expected from increasing or decreasing the quantity of the chief elements, and also from adding small percentages of this or that metal. In this connection, the following general points may prove useful.

Brass, an alloy of copper and zinc, becomes softer and weaker with increased additions of zinc from 19 per cent to 50 per cent, the usual limits of its use. Although the brasses high in zinc are cheaper, they can not be used where a high degree of toughness is desired. In like manner, impurities such as lead, tin, iron and bismuth lower the ductility and malleability of brass in almost direct proportion to the degree in which they are present.

For sheets and wires, the zinc should not be higher than 19 per cent to 21 per cent. Ordinary cold-working brass may contain 22 per cent to 30 per cent. For hot forging, the best brass contains 35 per cent to 40 per cent of zinc. For this class of work, moreover, an impurity of from 1 per cent to 3 per cent of iron is not harmful, but even improves the malleable quality of the metal.

The temperature of casting is also an important factor in determining the character of brass. To get the best results, the brass should be considerably overheated, and then have pieces of unmelted brass added to it in the ladle until the surface ceases to be bright and mirror-like. Then it is ready to pour.

If stiffness and hardness are desired, as in many classes of cast work, the addition of .6 per cent to 2.4 per cent of tin will produce this result.

From 1 to 2 per cent of lead makes brass easier to cut in the lathe or planer, as the toughness of the metal is reduced, and the cuttings offer less resistance to the tool.

"Tombak" is a gold-yellow to red-brown brass containing not more than 18 per cent of zinc. Free from the impurities of tin and lead, its ductility and malleability are very close to those of pure copper. On this account it is much used for stamping and spinning, though it can not be worked hot. Between 10 per cent and 18 per cent of zinc gives this alloy a color very close to that of gold, so that it is much used for art work that is to be given a final thin plating of gold. Unprotected, the alloy discolors too quickly on exposure to the air. For cast work of this class, 2 to 3 per cent of tin are added to insure a sound, strong metal.

An alloy that has become popular during recent years is "Delta" metal, containing

Copper	55	to 59	per cent.
Zinc	40	" 43	" "
Phosphor-Copper	0.2	to 0.7	per cent.
Mangan-Copper	1		" "
Iron	0.2	" 1.0	" "

This is stronger than brass and can be worked hot. The cupro-alloys are added chiefly to prevent oxidation during melting and pouring.

TINNING SMALL ARTICLES.

Der Metallarbeiter has an excellent article on tinning small articles of iron, copper and brass. Beside the common method of dipping the heated article in a bath of melted tin, two wet processes are given. The first is to put the article after cleaning into a boiling solution of tartar (argol) and adding granulated tin. Boiling is maintained for 1 to 2 hours, when the article will have a tin coating, excellent in appearance but not particularly durable. For tinning iron articles a thin coating of copper should first be applied to secure good adhesion.

For electrolytic work three formulæ are given, both strongly recommended by eminent authorities.

(1)	Sodium Prosphate Crystals	1¼ oz.
	Fused Tin Chloride	⅝ oz.
	Water	1 qt.

Current—.25 amperes at a tension of 1 to 1.25 volts.

(2)	Fused Stannous Chloride	1½ ozs.
	Soda Lye	2 ozs.
	Cyanide of Potash	⅜ oz.
	Water	1 qt.
(3)	Diammonium Stannic Chloride	1½ ozs.
	Water	1 qt.

For either of the last two .3 amperes are used, at a tension of 1.5 volts.

POTASSIUM STANNATE.

Der Metallarbeiter describes how potassium stannate (useful in wet tinning without the aid of the electric current) may be easily prepared.

Tin is granulated by pouring it in a thin stream into water. This is dissolved in concentrated nitric acid in a glass or earthenware vessel. Provision must be made for carrying up the chimney the brown fumes produced by this action.

A white powder of the oxide is formed, which must be freed by washing both from free acid and from undissolved tin. The dried oxide is mixed with pure potash, and melted in an iron kettle. When fully fused, the resulting tin stannate is granulated by pouring it out on a clean stone pavement. It is dissolved in boiling water as needed.

Under the title, "The Remaking of German Silver for the Manufacturing of Keys," the alloys now used in key-making and those in use some years ago are given.

(1) Early corrugated and flat keys.
(2) Modern currugated and flat keys.

	(1)	(2)
Copper	58.07 per cent.	65.16 per cent.
Zinc	30.81 " "	20.51 " "
Nickel	10.11 " "	12.67 " "
Lead	.62 " "	1.10 " "
Iron	.39 " "	.41 " "
Tin	.. " "	.15 " "

English patent No. 20,380, 1906, covers the use of small quantities of aluminum added to an electrolytic copper solution. It is claimed that this gives a more homogeneous and smoother deposit of copper. One working formula that is said to have given good results contains 12 per cent. copper, 12 per cent. free sulphuric acid and 1 per cent. aluminum sulphate.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN BRASS FOUNDERS' ASSOCIATION.—Charles J. Caley, president, New Britain, Conn.; Andrew M. Fairlie, secretary, McCays, Tenn.; John H. Seeler, treasurer, Philadelphia, Pa.

The Executive Board have voted to hold the first annual convention at Toronto, Canada, the first week in June, 1908. This is also the time and place chosen for the next convention of the American Foundrymen's Association, with which the Brass Founders' Association is closely allied.

New members joining during the month of November were:
Percy Allan, Bloomfield, N. J.
William H. Bell, St. Paul, Minn.
Standard Sanitary Manufacturing Company, Louisville, Ky.
Horace Richardson, Taunton, Mass.
J. B. Chapman & Company, Springfield, Mass.
J. M. Craig, Hartford, Conn.
Philip Duffy, Lockport, Ill.
Emil Schneider, Newark, N. J.
Brady Brass Company, New York, N. Y.
Peerless Heater & Valve Co., Flint, Mich.
Horner Brass Works, Philadelphia, Pa.
Walworth Manufacturing Co., So. Boston, Mass.
Johnson Service Co., Milwaukee, Wis.
Pittsburg Meter Co., E. Pittsburg, Pa.
Trenton Brass & Mach. Co., Trenton, N. J.
General Fire Extinguisher Co., Providence, R. I.
Great Western Smelting & Refining Co., Chicago, Ill.
W. D. Allen Mfg. Co., Chicago, Ill.
Jas. H. Callender, Arlington, N. J.

CONNECTICUT VALLEY METAL TRADES ASSOCIATION. The annual meeting of this association, which includes 37 of the largest manufactories working metal in the district, was held in the rooms of the association at 332 Main street, Springfield, Mass., on November 27. H. H. Bowman, president of the Springfield board of trade, reviewed the financial situation, voicing an optimism that saw only good to come. He found the cause of the financial stringency and the general shaking of confidence to be due mostly to the fact that corporations and large business interests in general have been expanding too rapidly and have been doing a larger business than they were capable of. He also attributed a share in causing the troubles to the general public, which has been living on too large a scale, and to the newspapers. He predicted that in a short time conditions will have gone back to normal and that the result will be a more wholesome tone in business and living in general.

H. M. Barker, president of the National Metal Trades Association, addressed the meeting relative to the work of the national association, while E. C. Page gave a review of the strike at the Page-Storms Drop Forge Company last summer. J. H. Cone, of Cincinnati, assistant secretary of the national association, reviewed the labor situation and also discussed the question of trade schools.

The following officers were elected: F. H. Page, Confectioners Manufacturing Company, of Springfield, Mass.; vice president, C. P. Fay, J. Stevens Arms and Tool Company, Chicopee Falls, Mass.; secretary, F. C. Breakspear, A. G. Spalding Company, Chicopee. Executive Committee: R. D. Reed, H. B. Smith Company, Westfield; F. C. Feiker, Northampton Cutlery Company, Northampton; M. W. Bushnell, G. H. Bushnell Press Company, Thompsonville; T. J. Rider, J. B. Chapman & Company, Springfield.

SOCIETY OF CHEMICAL ENGINEERS. A circular letter has been sent out by the committee in charge of the movement to organize a society of chemical engineers, the chairman being Dr. Charles F. McKenna, 221 Pearl street, New York City. This movement started at the Atlantic City convention of the American Society for Testing Materials when it was proposed to start a society of trained chemists who are designing, constructing, managing or controlling establishments involving the application of chemical principles to the treatment of raw materials or doing work having an intimate connection with such operations. The society should have a high standard of admission. It was the opinion of those present at that meeting that the formation of such a society would tend to raise the standing of chemists among manufacturers and that many other advantages would accrue, among which the following were mentioned: 1, Raising the standard of education of chemists; 2, raising the ethical standard of the profession; and 3, encouraging bold and original work by members. The movement in no way clashes with existing chemical societies since the aims and objects are entirely at variance.

GERMAN FOUNDRY FOREMEN'S ASSOCIATION.—The following item is taken from the Transactions American Foundrymen's Association:

The several local societies of foundry foremen existing in the East, West, and middle Germany, as well as the large number of foremen in Germany not heretofore affiliated with any society, have joined the North German Association, and at the recent convention in Hanover, the name of the organization was changed to the "German Foundry Foremen's Association." Thus our American Foremen's Association now has a friendly rival in Europe. The chairman of the organization is H. Meier, Waldstrasse, 17, Hanover, Germany.

THE ASSOCIATED FOUNDRY FOREMEN'S REVIEW, issued monthly by the Association of Foundry Foremen, comes to us this month filled with matter of interest to those engaged in the work of the foundry. The first article on the "Discovery of Iron Ore and First Attempt by Europeans to Manufacture Iron in the United States" was first published in 1901 by the Old Colony Historical Society in the interest of the memorial to Henry and James Leonard, ironmasters and early settlers of Taunton, Mass. Other articles are as follows: High and Low Blast Pressures in the Cupola, by William H. Coleman; Estimating in the Foundry, by E. A. Kebler; Foundry Education, by F. C. Everitt, secretary of the association; Steel Castings in Locomotive and Car Construction, by J. V. McAdam.

THE Maiden Lane Realty Company, chartered under the laws of New York with a capital of $1,000,000, will erect a 20-story building on Maiden Lane, New York City, and running through to John street, to be known as the Silversmiths' Building. The location is in the heart of the precious metal trade of the city. It is expected the structure will cost $2,250,000. The stockholders met in Providence, R. I., on September 25, for the purpose of organization and elected a board of directors as follows: B. P. Cheney, Boston; Everett I. Rogers, Providence; Russell Grinnell, Providence; Joseph E. Fletcher, Providence; Edward Holbrook, New York; George C. Comstock, New York; John St Holbrook, New York; T. Zurburgg, New Jersey; Col. Samuel P. Colt, Providence; James Hanley, Providence, and Harold J Gross, Providence.

Immediately a meeting of the directory was held, at which officers were elected as follows: President, Edward Holbrook; vice-president, Harold J. Gross; treasurer, John S. Holbrook; executive committee, Edward Holbrook, John S. Holbrook, George C. Comstock, Joseph E. Fletcher and Harold J. Gross.

President Holbrook announced that four-fifths of the capital stock has been subscribed.

THE METAL POLISHERS', BUFFERS', PLATERS', BRASS MOLDERS' AND BRASS AND SILVER WORKERS' INTERNATIONAL UNION OF NORTH AMERICA.—Headquarters, Room 409, Neave Building, Cincinnati, O.; President, A. D. Grout, Neave Building, Cincinnati, O.; General Secretary and Treasurer, Charles R. Atherton, Neave Building, Cincinnati, O. The objects of the society are to improve the condition of the workers in the industry.

Cornelius Smith, Jr., of the Camden Smelting Works, Camden, N. J., is very ill with a spinal disease that has kept him away from business for some time.

Frank Bancroft is the new president and general manager of the Monarch Emery & Corundrum Wheel Company, Camden, N. J. The company are now under new management and have made large improvements to handle business better and quicker.

Jeremiah Howe, the superintendent of the Michigan Copper and Brass Company, Detroit, Mich., has recently been sick enough to go to the hospital, something unusual for him, but after a stay of two weeks he recovered and is now active as ever in the mill.

At the directors' meeting of the Michigan Copper & Brass Company, Detroit, Mich., held October 31, 1907, the following officers were elected: George H. Barbour, president; James E. Danaher, first vice-president; David M. Ireland, second vice-president; George H. Barbour, Jr., treasurer; J. R. Owen, secretary. Directors: Fred M. Alger, George H. Barbour, E. J. Corbett, James E. Danaher, Jeremiah Dwyer, David M. Ireland, Henry B. Ledyard and Fred T. Moran.

Frank Nicholson, of St. Louis, Mo., has been made president of the recently organized Consolidated Zinc Company, which was capitalized at $20,000,000. Mr. Nicholson is well known in the Tri-State and Joplin fields as a heavy individual operator and investor. Of the twenty-nine properties of the Joplin field which were included in the merger he is the owner of twenty-one. He holds a high position in the mining world, hence his selection for the presidency.

Some changes which have taken place in the MacFarland-Snyder Company, of 1104 St. Clair avenue, N. E., Cleveland, Ohio, are that W. P. Deutsch has succeeded M. W. Snyder as secretary, and N. H. Bassett has become treasurer in place of H. E. Biggs. The other officers of the company are W. A. MacFarland, president, and E. M. Schultz, Jr., vice-president. The company at present are busy and have recently taken new quarters at the address mentioned, where they have a very nice store.

L. G. Delamothe, the master plater who has been engaged in Chicago several years in the metallizing of flowers, has moved to 1207 Shannon avenue, Spokane, Wash., where he is building a small factory He moved to the state of Washington because it has finer flowers and a better climate. On November 12th Mr. Delamothe writes that roses are still blooming and that the grass is green. He has all of the orders that he can attend to. Mr. Delamothe's work has been illustrated and described in former issues of THE METAL INDUSTRY.

W. H. Bennett has been reappointed manager of the Chicago office, 105 Lake street, of the Reading Hardware Company, Reading, Pa., and begins his work January 1. Mr. Bennett opened this office nearly twenty years ago and continued its management until about two years ago, when other interests demanded his attention. When he retired the company discontinued the carrying of a stock at Chicago, shipments being made direct from the factory. Now, in order to better serve the trade in that territory, the warehouse will be reopened and a full and complete stock carried.

A number of changes have taken place recently in the personnel of the Randall Tramrail Company, Trenton and Allegheny avenues, Philadelphia, Pa. A. W. Moyer and C. H. Fries have resigned and severed their connection with the firm, likewise C. B. Leonard and H. B. Russell. Messrs. Moyer and Fries have established the Moyer Tramrail Company and have recently moved their offices from 800 Chestnut street to 132 S. 3rd street, Philadelphia, Pa. They design, manufacture and sell tramrails and put in systems. C. B. Leonard and H. B. Russell have formed the Philadelphia Tramrail Company with offices and shops at Front and Tusculin streets. They manufacture and sell tramrail systems. R. D. Randall is at present continuing and managing the business of the Randall Company with offices at 331 N. 2nd street and shop at Allegheny and Trenton avenues. He has equipped a number of brass foundries with the Randall System.

DEATHS.

John H. Gault, who died recently, August 21, 1907, was born in Port Carbon, Pa., in 1869. He was of very studious habits and mastered several languages in his "teens." At the age of 17 he took charge of the White Metal Department of the Hen Fruit Jar Company, of Philadelphia. About five years ago he commenced the manufacture of table silverware, and two years later perfected and patented the process of making seamless silverware, which revolutionized the manufacture of that ware in this country and greatly surprised the large silverware manufacturers of the United States. He was ver yshy and retiring, though intensely self-reliant, choosing rather to overcome the obstacles and opposition he met by the might of his own abilities; to suffer and be silent than to call upon those nearest and dearest to him for help or sympathy, which also made it difficult to sound the depth of his abilities.

These traits in his character were so strongly marked that they had a very serious effect upon his health, and before his friends were aware of it he had developed a fatal case of quick consumption, which resulted in his death at a period of his life when he should have been in the flower of his ability and usefulness.

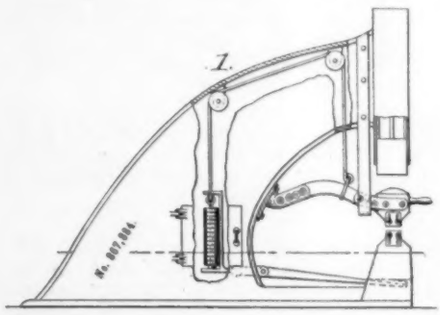
JOHN H. GAULT.

Samuel C. Walker, president of the Harbison-Walker Refractories Company, Pittsburg, Pa., died November 23, at his home, Shields Station, Pa. Mr. Walker was a native of Allegheny, where he was born 59 years ago. All his life he had been active in various large business enterprises. In 1889 he became connected with the Harbison-Walker Company, formed at that time, and until 1902, when the Harbison-Walker Refractories Company was formed, he was its president; since that time he was the active head of the new concern.

PATENTS

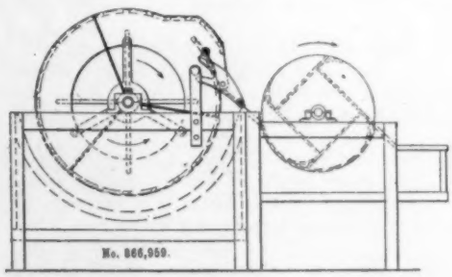
REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

867,884. October 8, 1907. MACHINE FOR REMOVING GATES AND RISERS FROM CASTINGS. Rodney O. Jones, Granite City, Ill. This invention has for its object the convenient and expeditious removal of gates and risers from castings. It consists of an improved arrangement of cutting dies with a steam hammer, the latter being disposed directly above the dies, one of which is movable and adapted to be operated by impact of the hammer.



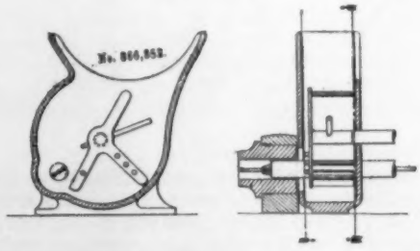
The steam hammer may be of any approved pattern that will admit of perfect regulation of the length as well as the force of the stroke delivered.

866,959. September 24, 1907. ELECTROPLATING APPARATUS. Louis Potthoff, Flushing, N. Y. In this machine the articles are handled mechanically, in transferring from one tank to another. Two forms are shown in the patent, one for handling small



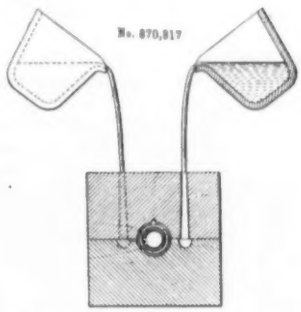
articles, such as nails, etc., and the other for elongated material such as rods, pipes, etc. The articles are automatically discharged from the barrel when the latter revolves in one direction, but are retained in the barrel when it revolves in the opposite direction.

866,852. September 24, 1907. CORE PRESSING APPARATUS. Petter Eriksson, of Lund, and Soren Peter Nielsen, of Vesteras,



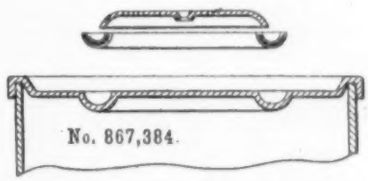
Sweden. In some core machines the sand is packed in the core box by hand and the core is forced out by hand, or the box is made in two parts which can be separated for the removal of the core. There are also the screw machines which deliver the core continuously. In the present invention the core forming device is located in the lower part of the feed box and consists of a piston passing through two oppositely placed openings in the walls of the box. In line with the piston and on the outside of the box is placed a core mold into which the sand is forced. The end of the piston is provided with two or more obliquely projecting pins. The object of these is that when the piston is drawn back from the core mold, to tear up or break down the inner end of the core in the mold, so that the piston, when pressing another charge of sand into the mold at the next stroke, will not pack the same against a hard, smooth surface. Unless this is done the finished core would not have sufficient cohesion and would be weak at this point.

870,869. November 12, 1907. APPARATUS FOR HOLDING AND POURING METAL INTO MOLDS FOR CASTING MACHINES. Edgar A. Custer, Philadelphia, Pa. This invention relates particularly to ladles containing the molten metal and means for supporting and



tilting them. The ladle is so supported that the spout is held in a fixed position with respect to the mold. Also the spout is held in the same horizontal plane during the pouring.

867,384. October 1, 1907. MANUFACTURED SOLDER. Edward M. Lang, Jr., Portland, Me. This arrangement is intended for soldering can caps. It consists in a ring or washer of solder between the upper and lower surfaces of which is inclosed a flux which is distributed uniformly through the ring. The ring is curved to permit it better to be received into and fit the groove around the



stud in the top of the can. Such ring, containing as it does the necessary amount of flux to enable the soldering of each cap to be accomplished, the process of soldering is performed with greater thoroughness by reason of the uniform distribution of the flux, while the manner in which it is enclosed between the surfaces of the ring permits it to be kept for any length of time without loss of the flux.

871,301. November 19, 1907. MAGNETIC SEPARATOR. Alfred Schwarz, New York City. This invention comprises a reciprocating table, the desired separation being affected by a bank of magnets placed in rows runing diagonally across the table. By means of a suitable commutator the rows of magnets are successively energized and de-energized so as to develop fields of force along successive sections of the table, the magnetic particles being transported across the table in a direction transverse to that of the magnets.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

The New Jersey Aluminum Company has established a Philadelphia office at 366 Bourse Building in charge of F. G. Bowles & Co.

The Columbian Hardware Company, of Cleveland, Ohio, desire information from the builders of acid proof floors for plating rooms.

Chambers & Ainslee, 2 Commercial street, Newark, N. J., brass founders and finishers, have recently changed the firm name to Chambers & Co.

The Penberthy Injector Company of Detroit, Mich., are now settled in their handsome offices at 366 Holden street, which they have recently built.

The Olin Gas Engine Company, of Buffalo, N. Y., announce that they are doing considerable export business, shipping their engines to Australia.

The firm of H. Quellet et Cie., 31, Rue Virte, Quest, Montreal, Canada, manufacturers of carriage mouldings, has been succeeded by P. Kent.

Benj. Middleditch, a manufacturer of foundry machinery of Detroit, Mich., reports that he has work enough in his shop to last him until next August.

The Roberts Brass Works, of Detroit, Mich., report a very good year, having run their works steadily to date with no reduction in their time schedule.

Cattelani Brothers & Co., 4, vico Del Campo, Genoa, Italy, are interested in all classes of American machinery and would like to correspond with the builders.

The S. Obermayer Company, of Cincinnati, Ohio, report that they are as busy as ever in taking care of orders for foundry supplies and have all they can handle.

The W. W. Sly Manufacturing Company, of Cleveland, Ohio, report a fairly active demand for their crusher which they are selling to foundries in all sections of the country.

The Hercules Smelting Company, of Buffalo, N. Y., have gone out of business, the manager, Jos. Kuhn, having become connected with the Niagara Brass Works of Buffalo.

The Tilghman-Brooksbank Sand Blast Company, 1126 South 11th street, Philadelphia, Pa., are getting out a smaller sand blast machine that will be particularly adapted to brass foundries.

The large brass factory of McKenna Brothers at Pittsburg, Pa., report that they are nearly as busy as usual in manufacturing the variety of goods which they turn out. They are founders, finishers and platers.

L. H. Gilmer & Co., manufacturers of polishing belts at 504 Arch street, Philadelphia, Pa., report that they have recently doubled the capacity of their plant and they are six weeks behind orders.

Dodge & Day, 5th and Chestnut street, Philadelphia, Pa., constructing engineers and builders, have extended their lines of operations, and now build foundries, factories, and any kind of industrial factory or shops.

The Carborundum Company, of Niagara Falls, N. Y., have finished their new furnace room and are now putting up another building. The company now occupy a floor space of 288,557 square feet or six and one-half acres.

Fries & Co., founders, finishers and platers, of 88 Main street, Buffalo, N. Y., report that they have been doing more aluminum work than they have done in years. They have recently added a plating department to their factory.

The Willard Supply Company have started business at 2314 Wood street, Philadelphia, Pa., to sell the products of the Crescent Phosphorized Metal Company of the same city. Their specialties are "Phosphorized Copper and Tin."

The Reliance Metal Company, with offices in the Empire Building, Pittsburg, Pa., and a smelting works at Meadville, Pa., are now looking for an eastern plant. They desire to obtain a plant somewhere on the Atlantic Seaboard.

T. B. Hagstoz, gold and silver refiners of 709 Sansom street, Philadelphia, Pa., report that their trade extends throughout the United States and Canada and that business is steady, not being affected by recent panics.

The Finkell-Hachmeister Chemical Company, of Pittsburg, Pa., report a remarkable success with their Red Copper Compound for platers' use. They report that they were the originators of this product and are now selling it everywhere.

The Detroit Lubricator Company, of Detroit, Mich., have moved their offices into their new handsome three-story building, which contains the cost department, superintendent's offices, purchasing department, general manager and accounting offices.

The W. P. Davis Machine Company are now entirely settled in their fine new shops and storehouse alongside the New York Central Railroad tracks at Rochester, N. Y. They manufacture various machine tools and also deal in various tools and supplies.

Chas. H. Besly & Co., of Chicago, Ill., are handing out as a souvenir a paper cutter made of Helmet Spring Bronze, which bronze is manufactured by this firm. The cutter is of a shape which makes it serviceable for opening letters and is very lasting.

A recent improvement in the Schwartz metal melting furnace manufactured by the Hawley Down Draft Furnace Company, of Chicago, Ill., is the attachment of electrical motors, enabling the operation of tilting to be done by either electric power or hand.

The Electric Smelting & Aluminum Company, of Lockport, N. Y., are handling considerable aluminum dross and skimmings which they reduce to metal in their new concentrating plant. They can take care of the scrap which cannot be handled by the dealer.

The Buffalo Foundry Supply Company, of Buffalo, N. Y., announce that they are selling considerable of their Columbia Core Compound to the brass and aluminum foundries. They do a considerable business in various parts of the country and in Canada.

The A. Garrison Foundry Company, of Pittsburg, Pa., have not felt the business depression as yet, though orders have not been as brisk recently. They are specialists in rolling mill machinery, having supplied a number of the brass, copper and aluminum rolling mills.

A new brass foundry is to be started at 1400 Niagara street, Buffalo, N. Y., in the building of E. R. Thomas Shop, No. 3. J.

Van Stemburg is the manager and Charles Dutcher, foreman of the Unique Metal Company, 25 Illinois street, Buffalo, will be in charge of the foundry.

A busy shop in the general dullness of the past month is the Damascus Bronze Company, of Allegheny, Pa., and the management report that they have work enough to last them far into the winter months. The company are general founders, making a specialty of railroad bearings.

Notice is given that by a decree of the Superior Court, sitting in equity at Springfield, Hampden County, Mass., on the 23rd day of November, 1907, that John K. Judd, of Holyoke, Mass., was appointed a receiver of all the assets of the Barlow Manufacturing Company, of Holyoke.

The L. H. Gilmer Company, 504 Arch street, Philadelphia, Pa., report an active demand for their polishing belts and they are still behind in orders. They have recently established a London office at 8 White street in charge of Walter P. Notcutt. Their specialty is endless polishing belts.

Chas. A. Smith, 245 Church Lane, Germantown (Philadelphia), Pa., manufacturer of machinery, gas engines, etc., has moved his business to Chester, Pa. Hereafter the firm will do business under the name of the Chester Engineering & Machine Company, Front and Penn streets, Chester, Pa.

G. J. Nikolas & Co., 400 W. Van Buren street, Chicago, Ill., manufacturers of the Nikolas lacquers, report that their business in October of this year was 203 per cent. greater than the same month a year ago. The firm has one of the finest equipped lacquer factories and reports a steady business.

The Baird Machine Company, of Oakville, Conn., manufacturers of dies, special machinery, foot and power presses and oblique tumbling barrels report that they have no fault to find with the business outlook, as they have their hands full and expect to have for some time to come.

Michael Hayman & Co. of Buffalo, N. Y., who have put up a new smelting works on the Belt Line Railroad of the same city, announce that they will start their new plant this month. They will continue their old works at 38 Perry street for a while. They smelt and sell white, red and yellow metals.

The new building of the International Acheson Graphite Company at Niagara Falls, N. Y., will be used for the manufacture of floculated graphite, which material will be used for lubricating purposes. The building will also give them additional shipping facilities. It will be occupied this month.

The Hill & Griffith Company, of Cincinnati, Ohio, are now located in their new office building, adjoining their new factory, both of which have been built since their fire of last summer They report a good business in their core ovens, which are particularly suitable for the use of brass foundries.

Every metal store usually has a sign, but J. H. Jolley & Co. of Philadelphia, Pa., have gone a step further and flung a great blue banner in front of their store with yellow, red and white lettering of their brass, copper and aluminum sheet, rod, wire and tubing. After dark they have an electrical sign.

Lewis Thompson & Co., Inc., 18th street and Indiana avenue, Philadelphia, Pa., are making a specialty of mahogany for pattern work which they sell for no more cost than white pine. They announce that mahogany is a natural pattern wood and they have solved the question of price. They solicit correspondence.

Hard times have not yet struck the Detroit Foundry Supply Company, of Detroit, Mich., for in the first half of November they did the largest business of any like period since they organized their firm. October was the second largest month they ever had. They report that orders have been coming in right along.

Few brass foundries have been running overtime during the past month, but an exception to this general rule is the Capitol Brass Works of Detroit, Mich., which through the month of November has been running until 9 o'clock every night. They manufacture radiator valves and also the Noble magnetic separator.

The H. L. Dixon Company, 8 Wood street, Pittsburg, Pa., has given up the agency of the Price's Perfect Pyrometer and henceforth this pyrometer will be sold by the manufacturers, the Electric Dental Manufacturing Company, 2759 Euclid avenue, Cleveland, Ohio. The pyrometer is guaranteed for a temperature of 3000 deg. F.

L. J. Swoboda is the successor to Smyth-Swoboda & Co., manufacturers of "Lycopart" parting compound, at 73 Warren street, New York. The firm will appoint agents in different sections of the country to act as distributors. The United States Navy foundry in Brooklyn, N. Y., has recently placed a large order for "Lycopart."

Francis J. Peck & Co. report that they now have one of the best laboratories in the West. They are located in the Williamson building, Cleveland, Ohio, which is a large office structure. They have installed there a complete laboratory for physical and chemical tests. They particularly desire business with the brass industry of the middle West and are equipped to handle it.

A new brass foundry which has been in operation a few months is the Acme at 363 Holden street, Detroit, Mich. Their specialty is trolley wheels and besides their foundry equipment which is new and modern, they have two Foster-Kimball turret lathes for finishing the wheels. J. J. Fezzey is president, J. H. Thomas secretary and treasurer, and E. G. Fezzey manager.

The J. A. Parker Company, 22 Indiana street, Buffalo, N. Y., have been shipping their automatic polishing machines to a number of firms in this country and several abroad. Among their recent sales have been four to the Badger Brass Manufacturing Company, of Kenosha, Wis., which firm has ordered ten more. They have sold one to Joseph Lucas, Limited, Birmingham, England.

The specialty of the United States Chemical Company, 3621 Lakeside avenue, Cleveland, Ohio, is Vienna lime, but besides they manufacture and sell tripoli, emery cake, grain emery, flour emery, crocos and rouge. They have a new brass polish which they call "White Tripoli." Their goods are put up in patent cans that readily open in two halves and permit the contents being easily removed.

The Columbus Die, Tool & Machine Company, of Columbus, O., have leased a plant at 191 Naghten street, and are busy moving their heavy machinery into it. The new works will give the extra space so much needed. In addition to leasing the new plant the company have installed additional machinery and are now in position to handle all classes of tools and special machine work that may be presented.

The work of constructing the three-story building for the Norwich Nickel & Brass Company on Chestnut street, Norwich, Conn., is being rushed by the contractor. The second floor is in place and good progress made toward the third. The contract for lighting and power for the new factory has been awarded to the Eaton Chase Company. Seven electric motors will be used to operate the different departments.

Ph. Bonvillain & E. Ronceray, builders of the French molding machine for the system of universal molding, report that they have recently received at their American office, 1315 Race street, Philadelphia, Pa., orders for $4,000 worth of molding machines from one firm alone. They have received orders amounting to $8,000 in the past six weeks. The company shortly expect to make a change in their American agency.

Some recent uses of Parsons' Manganese Bronze reported by the brass foundry of Cramps Ship Yards, Philadelphia, Pa., was an automobile crank case. This order was somewhat unusual, the crank cases being generally made of other metals. The foundry has recently put in a galvanizing tank 23 feet long for

hot galvanizing the plates and frames of torpedo destroyers. The tank will hold 150,000 lbs. of molten zinc.

The Standard Underground Cable Company have purchased a right to install and operate the Bates & Peard bright annealing furnaces for their works at Perth Amboy, N. J. The Detroit Copper and Brass Rolling Mills of Detroit, Michigan, have also purchased an exclusive right to the use of the same furnaces in their vicinity. Both of the above contracts were negotiated through C. M. Dally of 29 Broadway, New York, representing the Bates & Peard Company of England.

The English firm of McKechnie Brothers, metal refiners and merchants, with headquarters at Emerson street, Southwark, London, and works at Widnes, Birmingham, Manchester and Newcastle-on-Tyne, England, announce that they are smelters of every description of copper bearing metals. Also dealers in heavy copper, gunmetal and brass and are manufacturers of composition and brass ingots to any specification. Correspondence solicited with American and English firms.

The Frankfort Brass Works, of Frankfort, Ind., was sold at public auction on the 22d of November. The plant was sold to I. N. Perlstine, of Chicago, for $9,000, he assuming a mortgage of $10,000 held by the Farmers' Bank. It is probable the plant will be operated provided additional capital can be obtained. The new owner is perfectly familiar with the details of the business and he sees no reason why the business should not be carried on under experienced management and placed on a paying basis.

About a year ago Theo. A. Sippel, of 205 McWhorter street, Newark, N. J., was compelled to build an addition to his works, which more than doubled his capacity. Since that time his business has increased steadily, and at the present time is in the most satisfactory shape. His sand blast machines for jewelers and brass finishers have met a decided want and are being very generally introduced. He is also manufacturing an oil separating machine which is simple and effective in operation, and is being widely adopted.

The addition to the Buffalo (N. Y.) foundry of the Allyne Brass Foundry Company is finished and ready for equipment. It is located at 1095 Niagara street and will give the firm three times their former capacity. It is a brick building with a saw-tooth roof of modern construction and arrangement and will have modern equipment. The Allyne Company of Buffalo is connected with the other Allyne Foundries in Detroit and Cleveland, though they are operated independently. Mr. King is president and manager of the company.

The smelting and refining firm of White & Brother, Inc., 1505 E. Montgomery avenue, Philadelphia, Pa., who have been in business for half a century, report that they had recently the biggest week in their history. Their new copper smelting plant is in operation and they have just finished a sampling and storing house 32 x 76 feet, which is located on a siding of the Belt Line Railroad. The firm's specialty is red and yellow ingot brass and they are now in the market for copper bearing material, paying spot cash for any quantity.

The new mill of the Michigan Copper and Brass Company, Detroit, Mich., has been running two months and is doing a good business. The company report that most of their trade at present is from Detroit. They are gradually extending it to other sections of the country. The mill is now in a position to fill orders promptly for sheet rod, wire and tubing. All callers at the mill are courteously treated and what is quite remarkable for a rolling mill, any visitor who expresses a desire to see a mill in operation is shown through the plant.

H. M. Shimer & Co., 19th street and Washington avenue, Philadelphia, Pa., have moved into an office adoining their present smelting works. They now own the entire block fronting Washington avenue and their smelting plant has doubled in size since the establishment some five years ago. It measures 86 x 230 feet. Their specialty is a fine grade of spelter and brazing solders. They report doing as much business in the first nine months of 1907 as for the twelve months of 1906. During the winter they will put in fifteen new furnaces.

The copper rolling mill of C. G. Hussey & Co., of Pittsburg, Pa., have put in rivet machinery and are manufacturing nails and some other specialties. One of their recent products is railroad tie nails. When a tie is laid a copper nail with the year marked on the head is driven into the tie and by this means the section men can keep track of its age and remove it when it has lived its schedule railroad life. The Hussey rolling mill have also been supplying some government orders for copper material at the Panama Canal and at the New York Navy Yard.

The reports printed in the daily press about the 10th of last month that the Coe Brass Manufacturing Company of Torrington, Conn., had discharged 700 employes and advised them to seek employment elsewhere were untrue. The truth of the matter is that the company completed some outside work on which about fifty men were engaged. After this work had been finished the need for those men ceased and they were discharged. In the reports sent out these fifty men were magnified into 700 regular employes of the works.

Some aluminum business of interest reported by the Chicago office of the Aluminum Company of America is orders for tubing from the Corn Products Refining Company and other factories which desired tubing that would not corrode by various solutions. The company also received an order from the Adams and Westlake Company for metal for the oval window frames of the high speed cars built for the Union Pacific railroad. Another recent product of the company is by-metallic tubing, aluminum being drawn over copper or steel or inside of a copper or steel tube.

The Turner Machine Company, 2049 N. 2nd street, Philadelphia, Pa., have been selling their cock grinders all over the world, having recently shipped one to New Zealand and four to Australia. They have likewise sold four of their molding machines to the last-named country. They have sold six molding machines to the Westinghouse Air Brake Company of Wilmerding, Pa., and have orders for two of their sprue or gate cutters and are selling their patent sand sifter to the different industrial works of the country, having sold one to the Navy Department of San Francisco. The Turner shops are as busy as ever.

The International Chemical Company of Camden, N. J., are manufacturing "Kemical First Sorts Potash," which they say is a perfect substitute for the old-fashioned wood ash potash. The company report that it has been adopted by a large number of concerns who formerly thought there was no substitute for First Sorts wood ash potash. The majority of these concerns claim that it is just as efficient, besides having the advantage of being more convenient and more economical. This material is packed in iron drums, equipped with iron covers, whose weight on a rubber gasket keeps the material airtight, thus preventing deterioration of the material.

The Edna Smelting & Refining Company, of Cincinnati, Ohio, have taken over the business of the former John Porteous Manufacturing Company, John Porteous, who was vice-president and general manager and one of the founders of the company, having died some months ago. The present officers are: President and treasurer, Isaac Joseph; Vice-President, Emil Jacobson; Secretary, Henry Mendel. The company are brass founders and finishers, manufacturing a variety of brass cast goods and are also smelters of the red, yellow and white metals. In addition to their metal business they manufacture and sell a portable melting furnace. At present they report to have orders enough to more than carry them over the first of the year.

The J. D. Smith Foundry Supply Company, Cleveland, Ohio, report that they are making their Griffa patent air and water cooled ingot mould with the lettering which is required by babbitt metals. The mould is popular among machinery men. Among the recent foundries equipped by the engineering end of their business is the City Brass Foundry of Cleveland, where they have been putting in a cleaning and shipping room. Other equipment has been for the United Brass Manufacturing Company of Cleve-

land, where they have installed a battery of furnaces, two wall cranes and two rolling drawer core ovens. They recently supplied the Langsenkamp Brothers & Wheeler Company, Indianapolis, Ind., with a three ton 37 foot span traveling crane.

The plant of new Buffalo (N. Y.) Tube Company (particulars of the formation of which was mentioned in the November number of THE METAL INDUSTRY) will be a building 44 x 100 feet, located on Rano street, bordering on the D., L. & W. R. R. The plant is nearly completed and the company expect to be ready to operate by January 1st, 1908. They will manufacture seamless brass, copper, bronze and German silver tubing any size smaller than one inch diameter, No. 9 B. & S. gauge, and any shape desired. The company has a capital of $25,000 and the officers are H. Wood, president; E. B. Sherwood, treasurer; W. M. Park, secretary; Philip T. Smith, general manager. Mr. Smith was formerly assistant manager of the Benedict and Burnham Manufacturing Company, Waterbury, Conn., also formerly general superintendent at the Rome (N. Y.) Brass and Copper Company. The other officers of the company are business men.

FINANCIAL

The passing of the Aluminum Press Company of New York into the hands of a receiver, with liabilities for $178,900 and nominal assets $145,286, recalls an interesting phase of the development of the aluminum industry some ten years ago. This company was formed to build lithographic presses for using aluminum plates instead of stone, revolutionizing the method of lithographic printing. The company was more or less successful according to the business conditions and their method of printing has been taken up by other press builders, who are pushing the aluminum plate printing in all shops that it is feasible. Therefore, the failure and stoppage of the Aluminum Press Company will in no way affect this use of aluminum for printing.

INCORPORATIONS

THE AKRON BRASS & BRONZE COMPANY, of Akron, O., has been incorporated with a capital of $10,000, by Jacob Alder, M. A. Holhut, Henry M. Ebman, N. O. Mather and C. R. Greece.

THE FLEUR DE LIS AUTOMOBILE COMPANY, of New York city, has been incorporated with a capital of $25,000 to manufacture and deal in automobiles. The directors are: Fred Knowlton, 638 East 139th street; Edgar A. Montfort, 1250 St. Nicholas avenue, and E. D. Cronin, 277 Vanderbilt avenue, Brooklyn, N. Y.

THE NATIONAL TAXICAB COMPANY, of New York city, has been incorporated with a capital of $25,000 to manufacture self-propelled vehicles, motors, engines, etc. The directors are: W. Bernard Vause, Brooklyn, N. Y.; Woodford Mobry, 251 Washington avenue, New York city; Louis N. Vause, 128 Willoughby avenue, and E. Van Elten, 79 Lefferts place, Brooklyn.

THE CONTINUOUS ZINC FURNACE COMPANY, of Hartford, Conn., has filed a certificate of incorporation in the office of the secretary of the state. The company is authorized to discover and deal in methods of melting, smelting and refining zinc, to build and develop furnaces, and to deal in metals. The incorporators are Woolsey MacA. and Charles F. Johnson of this city and Ephraim Williams of New York. The capital is $125,000.

PRINTED MATTER

L. GOLDSTEIN & SONS, smelters and refiners, of 1036 North Front street, corner of Allen, Philadelphia, Pa., have sent to the trade a handsome calendar for 1908 with a pretty girl feeding a horse some sugar.

FOUNDRY FACING AND SUPPLIES. The new factory of the Hill & Griffith Company, Cincinnati, O., is now in operation, and the company are enabled to fill every want in the foundry facing and foundry supply line.

FOUNDRY LADLES. Byram & Company, of Detroit, Mich., have issued a neat catalogue descriptive of their wide lines of foundry ladles. These ladles range in size from little ones holding from 40 to 50 pounds up to geared crane ladles carrying 18,000 pounds.

ACID PROOF BRICK AND TILE. The New York Brick & Paving Company, of Syracuse, N. Y., manufacture acid proof brick for lining digesters, plating floors, acid tanks, etc. This trade has grown so large that the company now carry in stock brick for this purpose.

INCANDESCENT LAMP LACQUERS. M. L. Barrett & Company, of 219 Lake street, Chicago, Ill., are placing on the market lacquers particularly intended for coloring incandescent lamps. These lacquers are applied to the lamp bulbs and are made in every shade of color.

LUBRICATING GRAPHITE AND GRAPHITE PAINT. Pamphlets by the United States Graphite Company, of Saginaw, Mich., mention their lubricating graphite and also their graphite paint. The many applications and advantages possessed by these articles are set forth in the pamphlets.

FINE TOOLS. A very large and comprehensive catalogue has been issued by Charles H. Besly & Co., of 15 South Clinton street, Chicago, Ill., describing their various types of grinders, also the manufacturers' and machinists' hardware made by them. Their platers', polishers', and grinders' supplies are complete in that all the articles required in these lines are fully represented.

FOUNDRY SUPPLIES. A folder has been received from the J. W. Paxson Company, of Philadelphia, Pa., mentioning their "white dog" core flour, white seashore sand, and machine twisted hay rope for foundry use. Their new works for spinning hay rope are located at Port Norris, N. J., right in the heart of the salt hay country, and with easy shipping facilities by boat. This rope is made in sizes from ¼ inch to 1 inch, and in lengths from 2,300 feet for the smallest to 500 feet for the largest.

SMELTERS AND REFINERS. A very neat pocket memorandum book has been sent out by T. B. Hagstoz, Limited, smelters, refiners and assayers, of 709 Sansom street, Philadelphia, Pa. Quite recently Mr. Hagstoz introduced a modern electrolytic refining plant by which he is enabled to produce better, cheaper and quicker results. The back of the memorandum book contains tables of weights and measures, rates of postage and other information used daily by the business man.

ALUMINUM COOKING UTENSILS. The Aluminum Cooking Utensil Company, of Pittsburg, Pa., in their catalogue No. 10, describe a wide and varied line of cooking utensils. The specimens include tea and coffee pots, saucepans, preserving and tea kettles, frying pans, cake and pie pans, chafing dishes, etc. Their hotel ware is drawn from sheet aluminum 99 per cent. pure, and has a uniform thickness of 5-32 of an inch. Since these pans are solid metal throughout it is not necessary to have them tinned.

PHOSPHORATED COPPER is placed on the market for the use of phosphor bronze founders by the Willard Supply Company, 2314 Wood street, Philadelphia, Pa. It is stated to be an alloy of pure lake copper containing 15 per cent. of phosphorus. It is claimed that a small quantity of this metal used instead of copper makes the best grade of phosphor bronze. It is also advised for bearing metal and for use with scrap. According to a circular received from the makers one pound of phosphorated copper is equivalent in phosphorus to four pounds of phosphor tin.

PORTABLE ELECTRIC GRINDERS. The Hisey-Wolf Machine Company, of Cincinnati, O., have issued a neat catalogue dealing with their portable electric drills and grinders for direct or alternating current. Their electric aerial surface grinder was especially devised for rough surface grinding and the cleaning of castings of any kind. It also does away with considerable hand filing and chipping. Wheels for buffing, polishing and sanding can be attached. This grinder can be suspended anywhere or counterbalanced from the ceiling or a traveler. The motor is enclosed and dust proof, and all vital parts protected.

METAL MELTING FURNACES. We have received from the Hawley Down Draft Furnace Company, of Superior and Townsend streets, Chicago, Ill., a circular addressed to melters of brass, bronze, copper, aluminum, iron and steel, advocating the installation of a Schwartz melting furnace. The advantages mentioned for this furnace are as follows: No crucibles are used, this expense being saved by using a special fire brick lining which costs very little; no ashes to grind and fuel costs less than coke since crude oil, fuel oil or gas may be used; the labor expense is reduced, since one man is able to do the work of three.

BRUSHES AND BROOMS. This is the title of a very handsome catalogue of some 76 pages issued by the Galton Manufacturing Company, of Cleveland, O., describing the extended line of brushes and brooms made by them of flat and round wire, bristle and fibre. Their flat and round casting brushes are made of flat tempered steel wire; the round brushes are made of round tempered steel wire. Their circular scratch and satin finish brushes for nickel platers, brass finishers and all kinds of metal polishers, are made in two styles, wire drawn and sectional, the latter not being made smaller than 5 inches in diameter. The wire drawn Tampico brushes for platers and polishers are made of either white or gray Tampico, the stock being securely held with brass wire and cement. The company are in position to make special brushes and brooms of any desired material, and special attention is given to this class of work.

ELECTRIC DRILLS AND ELECTRIC TOOL POST GRINDERS. Two bulletins have been received from the Cincinnati Electric Tool Company, of Cincinnati, O. One describes their electric drill, which is provided with a fan, directly connected with the armature shaft which keeps the machine cool, even with constant and steady service. It also prevents small articles and chips from entering the drill at the chuck end. These machines are made to take twist drills from ¼ to 1 inch. Their electric tool post grinder is intended for use in lathes, shapers, planers, milling machines, boring mills, drill presses, etc. These grinders are furnished with an emery wheel 8 inches in diameter by ¾ inch face. Great power is developed by these tools and they run at the proper speed for the size of wheel furnished with them.

METAL MARKET REVIEW

NEW YORK, December 6, 1907.

COPPER.—The London speculative copper market has fluctuated actively during the month of November. Standard opened at £67, dropped to £58 and closed at £62 15s. The trading has been very active and prices show a net decline for the month of nearly £5 per ton.

The New York copper market has followed very closely the fluctuations in the London speculative market. Lake copper around the first of November was about 14.75 and prices declined during the drop in London in Standard copper to close to 13 cents, later advancing to about 14.25 and closing more or less dull and easier at around 13.50 to 13.75. Confidence is very slowly returning and shows in increased inquiries for large lines. For the first quarter of next year there has been a fair business done during the month, but the larger consumers have not entered the market and unless conditions improve very materially the larger buyers may continue to hold off. The exports for the month are 33,778 tons, being the heaviest on record for any month. So far there is no way of knowing whether this copper is going into consumption or is to be put into warehouse; any way it relieves the home market very materially and makes producers more independent. It is to be noted too that at around 13 cents there is a heavy export demand; foreigners apparently, and very wisely, feel that 13-cent copper is a buy and it is quite possible the larger home consumers may be sadly left if they put off their buying too long.

The market at the close is fairly steady at around 13.75 for Lake and Electrolytic and 13.25 for casting grades.

TIN.—The London tin market shows a decline for the month of about £8 per ton, due principally to the small demand from America.

The New York market has gradually worked off, following the decline abroad. Consumers and dealers here have no faith in the stability of this article pending the liquidation of the heavy Chinese bull account and for this reason the future of the market is very uncertain. The statistics are not bullish in any way and conditions generally do not favor any bullish movements just now. The market to-day is around 30 cents for prompt delivery down to 29½ cents for later deliveries for 5 and 10 ton lots.

LEAD.—The foreign lead market has declined nearly £2 per ton during the month, closing at £16 5s.

The New York market has declined about ½ a cent a pound and at the close is weak and unsettled, with St. Louis quoted at close to 4 cents against about 4½ a month ago. They are reported to be heavy stocks. The most interesting feature to note was the announcement of the Trust to the effect that in future they would have no established price, but would sell at the market if so inclined. At present writing they are not so inclined and are holding for about 15 points above present prices. We call the market to-day weak at 4.15 New York for carload lots.

SPELTER.—The London price has declined about £1 per ton and the market there is still below our parity.

The New York spelter market has declined steadily and persistently the whole month and prices to-day about ¾ of a cent below figures of amonth ago. St. Louis is down to 4.35 to 4.40 and weak and New York is about 5.55 to 5.60 for December shipment. Present prices are fairly low for spelter and producers will not sell futures at prices ruling to-day.

ALUMINUM.—The price for ingot aluminum has dropped to 38 cents per lb. for ton lots, smaller quantities 38 and 39. Sheet aluminum has been reduced 5 cents per lb. and is back to a 42 cent base. Rod and wire has ben reduced 2 cents per lb.

ANTIMONY.—The London market has ruled easier and prices showed a decline of about £5 per ton.

In the New York market there has been no interest taken in this metal, consumers simply buying in small quantities as they need the metal. Prices are over 1 cent lower. Cooksom around 10 cents, Halletts 8¾ and Hungarian grades about 7¾ to 8 cents.

SILVER.—The London price of silver is about ½ cent lower at 26¾d. and around 67 cents here.

SHEET METALS.—There has been no change in prices in sheet copper or brass tubing, etc. The last list prices were based on 15 cent copper and the manufacturers see no reason for changing the price in view of the improved statistical position of ingot copper. Sheet copper stands at 20 cents base.

OLD METALS.—The market in all kinds of copper scrap has been better and with the decline in ingot copper pretty well over the scrap copper market has been able to arrive and settle at a fair base price and trading has been rather more encouraging. Zinc scrap has been weak and zinc dross also at about 3⅝ to 3¾ New York buyers.

THE NOVEMBER MOVEMENT IN METALS.

	Highest.	Lowest.	Average.
COPPER—			
Lake	14.75	13.25	13.75
Electrolytic	14.50	13.00	13.50
Casting	14.25	12.75	13.25
TIN	32.00	30.00	30.90
LEAD	4.60	4.30	4.40
SPELTER	5.45	5.00	5.20
ANTIMONY (Halletts)	10.00	9.25	9.50

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Reports of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking. We can also furnish daily telegraphic reports of metal prices.

See Advertising Page 21 Following for Trade Wants

Metal Prices, December 9, 1907

NEW METALS.

	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER. Duty Free. Manufactured 2½c. per lb.	
Lake, carload lots	13.75
Electrolytic, car load lots	13.75
Casting, car load lots	13.25
TIN—Duty Free.	
Straits of Malacca, car load lots	30.00
LEAD—Duty Pigs, Bars and Old 2½c. per lb. pipe and sheets 2½c. per lb.	
Pig lead, car load lots	4.20
SPELTER—Duty 1½c. per lb.	
Western, car load lots	4.70
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots.....Nominal	40.00
100 lb. lots..... "	39.00
Ton lots ..... "	38.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's, cask lots, nominal	10.00
Halletts, cask lots	9.00
Other, cask lots	8.50
NICKEL—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty Free	$1.40 —
BISMUTH—Duty Free	1.80
CADMIUM—Duty Free	1.55 to 1.60

	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.58½
PLATINUM—Duty Free	27.00
QUICKSILVER—Duty 7c. per lb. Price per pound	.63c. to 64c.

OLD METALS.

	Price per lb.	
Heavy Cut Copper	11.50	12.00
Copper Wire	11.00	11.50
Light Copper	9.75	10.25
Heavy Mach. Comp.	10.50	11.00
Heavy Brass	8.00	9.00
Light Brass	6.00	7.00
No. 1 Yellow Brass Turnings	7.00	7.50
No. 1 Comp. Turnings	9.00	9.50
Heavy Lead	3.75	4.00
Zinc Scrap	3.50	4.00
Scrap Aluminum, sheet, pure	21.00	22.00
Scrap Aluminum, cast, alloyed	19.00	20.00
Scrap Aluminum, turnings	8.00	10.00
Old Nickel, solid	22.00	26.00
No. 1 Pewter	21.00	22.00

INGOT METALS.

	Price per lb.
SILICON COPPER, according to quantity	33 to 38
PHOSPHOR COPPER, 5%	19 to 21
Phosphor Tin	40 to 42
Brass Ingot, Yellow	10 to 12
Brass Ingot, Red	13 to 15
Bronze Ingot	12 to 14
Manganese Bronze	17 to 19
Phosphor Bronze	18 to 21

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
600 lb. casks	8.00
Open casks	8.50

PHOSPHORUS—Duty 18c. per lb.	
According to quantity	35 to 45

PRICES OF SHEET COPPER.

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb. sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	20	20	20	20	20	21
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	20	20	21
	Longer than 96 ins.	20	20	20	20	20	22
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	20	20	20	20	20	22
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	20	20	22
	Longer than 96 ins. Not longer than 120 ins.	20	20	20	20	21	23
	Longer than 120 ins.	20	20	20	21	22	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	20	20	20	21	22	24
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	21	23	25
	Longer than 96 ins. Not longer than 120 ins.	20	20	20	22	24	28
	Longer than 120 ins.	20	20	21	23	26	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	20	20	20	21	23	26
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	22	24	29
	Longer than 96 ins. Not longer than 120 ins.	20	20	21	23	26	
	Longer than 120 ins.	21	21	22	24	28	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	20	20	1	23	28	
	Longer than 96 ins. Not longer than 120 ins.	20	20	22	25	30	
	Longer than 120 ins.	21	21	23	28		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	21	21	23	26		
	Longer than 96 ins. Not longer than 120 ins.	22	22	24	27		
	Longer than 120 ins.	23	23	25	29		
Wider than 108 ins.	Not longer than 132 ins.	24	24	26			
	Longer than 132 ins.	25	25	28			

Rolled Round Copper, ⅝ inch diameter or over, 20 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, December 9, 1907

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot and heavier, per lb.	24c.
12 oz. and up to 14 oz. to square foot, per lb.	25c.
10 oz. and up to 12 oz.	27c.
Lighter than 10 oz.	30c.

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect December 2nd, 1907, and until further notice.

To customers who purchase less than 5,000 lbs. per month and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14¼	$0.16⅝	$0.18½
Wire ¼" and larger	.14½	.16⅝	.18⅝
Wire smaller than ¼" to No. 8, inclusive	.15¼	.17⅛	.19½
Wire smaller than No. 8 to No. 10, inc'sive	.15⅝	.17⅛	.19⅝
Rods ¼" and larger to ½" diameter	.14⅝	.16⅞	.19⅝
Rods ½" to 1" diameter, both inclusive	.14½	.16⅝	.19⅝
Brazed brass tubing	.20¾	—	—
Brazed bronze and copper tubing	—	—	.23½
Open seam brass tubing	.18¾	—	—
Open seam bronze tubing	—	—	.21½
Brass angle and channel	.20¾	—	—
Bronze angle and channel	—	—	.24⅝

15% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	1¼c. per lb. net advance.
" —Best spring, drawing and spinning brass	2¼c. " " " "
" —Rich low brass	¾c. " " " "
Wire—Extra spring and brazing brass wire	1¼c. " " " "
" —Best spring and brazing brass wire	2¼c. " " " "
" —Rich low brass wire	¾c. " " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.15¼	$0.17⅝	$0.19½
Wire ¼" and larger	.15½	.17⅝	.19⅝
Wire smaller than ¼" to No. 8, inclusive	.16¼	.18⅛	.20½
Wire smaller than No. 8 to No. 10, inc'sive	.16⅝	.18⅛	.20⅝
Rods ¼" and larger to ½" diameter	.15⅝	.17⅞	.20⅝
Rods ½" to 1" diameter, both inclusive	15½	.17⅝	.20⅜
Brazed brass tubing	.21¾	—	—
Brazed bronze tubing	—	—	.24½
Open seam brass tubing	.19¾	—	—
Open seam bronze tubing	—	—	.22½
Brass angle and channel	.21¾	—	—
Bronze angle and channel	—	—	.25⅝

5% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	2¼c. per lb. net advance.
" —Best spring, drawing and spinning brass	3¼c. " " " "
" —Rich low brass	1¾c. " " " "
Wire—Extra spring and brazing brass wire	2¼c. " " " "
" —Best spring and brazing brass wire	3¼c. " " " "
" —Rich low brass wire	1¾c. " " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 20c. per lb.
Seamless Copper Tubing, 23c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	28	27	22	21	20	20	20	20	20	20	20	21	22	24	26	27

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 Feet. Brass.	Bronze.
⅝ inch	$8.00	$9.00
½ inch	8.00	9.00
⅝ inch	10.00	11.00
¾ inch	12.00	13.00
⅞ inch	14.00	15.00
1 inch	18.00	20.00
1⅛ inch	22.00	24.00
1¼ inch	25.00	27.00
1½ inch	32.00	35.00
1¾ inch	45.00	48.00
2 inch	56.00	60.00

Discount 45 per cent.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Munts or Yellow Metal Sheathing (14" x 48")	16c. lb. net base.
" " " Rectangular Sheets other than Sheathing	18c. " " "
" " " Rod	17c. " " "
Tobin Bronze Rod	18c. " " "

Above are for 100 lbs. or more in one order.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quality.
Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than ..... and including.. in coils.	3in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
No. 13 and heavier	42	42	44	44	44	44	47	47	47
" 14	42	42	44	44	44	44	47	47	47
" 15	42	42	44	44	44	44	47	47	47
" 16	42	42	44	44	44	44	47	47	47
" 17	42	42	44	44	44	44	47	47	47
" 18	42	42	44	44	44	44	47	47	50
" 19	42	42	44	44	44	44	47	48	51
" 20	42	44	44	44	44	46	49	50	52
" 21	42	46	46	46	46	48	51	52	58
" 22	42	46	46	46	48	48	51	55	59
" 23	42	46	46	46	48	48	51	57	60
" 24	42	46	48	50	50	50	53	59	62
" 25	44	47	49	51	51	51	54	61	65
" 26	44	47	50	54	54	54	59	63	69
" 27	44	48	52	56	56	57	62	66	72
" 28	44	48	54	56	57	57	64	70	75
" 29	46	49	56	58	60	60	69	75	80
" 30	46	50	58	60	64	70	78	80	85
" 31	51	55	63	66	71	79	82	85	91
" 32	53	57	65	69	77	85	92	98	103
" 33	55	59	68	73	81	92	99	108	118
" 34	58	63	70	78	86	99	111	118	128
" 35	..	73	78	88	98	108	123	133	..
" 36	..	88	98	108	123	128	143	..	..
" 37	..	112	116	137	152	167	182	..	..
" 38	..	132	147	162	177	192	212	..	..
" 39	..	152	172	192	212	232	..	..	..
" 40	..	182	212	232	252	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11	..	..	96	86	83	77	67	61	61	61
12	..	1.08	96	86	83	77	67	61	61	61
13	..	1.08	96	86	83	77	67	64	64	64
14	..	1.08	96	86	83	77	67	64	64	64
15	..	1.12	98	89	86	80	70	67	67	67
16	..	1.15	99	93	89	83	70	70	70	70
17	..	1.18	1.02	96	93	86	73	73	73	73
18	1.85	1.24	1.05	99	93	86	77	77	77	80
19	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20	1.95	1.31	1.15	1.08	1.05	99	89	86	86	86
21	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	1.05
23	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B. & S. G'ge	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb.	41	41½	41½	42	42½	43	43½	44	45	46	47	50	55

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 45 per cent.

GERMAN SILVER TUBING.

4	per cent. to	No.	19, B. & S. Gauge, inclusive		$0.60
6	"	"	19, " " "		.70
9	"	"	19, " " "		.85
12	"	"	19, " " "		1.00
15	"	"	19, " " "		1.15
16	"	"	19, " " "		1.20
18	"	"	19, " " "		1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.
For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 35 per cent.

PRICE OF SHEET SILVER.

Roller sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.
Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

GENERAL LIBRARY,
UNIV. OF MICH.
APR 15 1907

COMPLIMENTS OF
THE METAL INDUSTRY PUBLISHING COMPANY
61 BEEKMAN STREET, NEW YORK

The Practical Application of Scientific Metallurgy to the Foundry and Rolling Mill

By ERNEST A. LEWIS
Birmingham, England

New Alloys

By ANDREW M. FAIRLIE
Copper Hill, Polk County, Tenn., U. S. A.

Reprinted from "THE METAL INDUSTRY," JUNE, JULY and SEPTEMBER ISSUES, 1906

KINDLY FILE FOR REFERENCE

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Metal Prices, December 9, 1907

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot and heavier, per lb.	24c.
12 oz. and up to 14 oz. to square foot, per lb.	25c.
10 oz. and up to 12 oz.	27c.
Lighter than 10 oz.	30c.

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect December 2nd, 1907, and until further notice.

To customers who purchase less than 5,000 lbs. per month and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14¼	$0.16⅝	$0.18½
Wire ¼" and larger	.14½	.16⅝	.18⅝
Wire smaller than ¼" to No. 8, inclusive	.15¼	.17⅛	.19¼
Wire smaller than No. 8 to No. 10, inc'sive.	.15⅝	.17⅞	.19⅝
Rods ¼" and larger to ½" diameter	.14⅝	.16⅛	.19⅝
Rods ½" to 1" diameter, both inclusive	.14½	.16⅝	.19⅝
Brazed brass tubing	.20¾	—	—
Brazed bronze and copper tubing	—	—	.23½
Open seam brass tubing	.18¾	—	—
Open seam bronze tubing	—	—	.21½
Brass angle and channel	.20¾	—	—
Bronze angle and channel	—	—	.24⅝

15% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass....1¼c. per lb. net advance.
" —Best spring, drawing and spinning brass.....2¼c. " " " "
" —Rich low brass.....¾c. " " " "
Wire—Extra spring and brazing brass wire.....1¼c. " " " "
" —Best spring and brazing brass wire.....2¼c. " " " "
" —Rich low brass wire.....¾c. " " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.15¼	$0.17⅝	$0.19½
Wire ¼" and larger	.15½	.17⅝	.19⅝
Wire smaller than ¼" to No. 8, inclusive	.16¼	.18⅛	.20½
Wire smaller than No. 8 to No. 10, inc'sive.	.16⅝	.18⅞	.20⅝
Rods ¼" and larger to ½" diameter	.15⅝	.17⅞	.20⅝
Rods ½" to 1" diameter, both inclusive	15½	.17⅝	.20⅝
Brazed brass tubing	.21¾	—	—
Brazed bronze tubing	—	—	.24½
Open seam brass tubing	.19¾	—	—
Open seam bronze tubing	—	—	.22½
Brass angle and channel	.21¾	—	—
Bronze angle and channel	—	—	.25⅝

5% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass....2¼c. per lb. net advance.
" —Best spring, drawing and spinning brass.....3¼c. " " " "
" —Rich low brass.....1¾c. " " " "
Wire—Extra spring and brazing brass wire.....2¼c. " " " "
" —Best spring and brazing brass wire.....3¼c. " " " "
" —Rich low brass wire.....1¾c. " " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 2½ in. O. D. Nos. 4 to 18 Stubs Gauge, 20c. per lb.
Seamless Copper Tubing, 23c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	28	27	22	21	20	20	20	20	20	20	20	21	22	24	26	27

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 Feet. Brass.	Bronze.
⅜ inch	$8.00	$9.00
½ inch	8.00	9.00
⅝ inch	10.00	11.00
¾ inch	12.00	13.00
¼ inch	14.00	15.00
1 inch	18.00	20.00
1¼ inch	22.00	24.00
1½ inch	25.00	27.00
1½ inch	32.00	35.00
1¾ inch	45.00	48.00
2 inch	56.00	60.00

Discount 45 per cent.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Muntz or Yellow Metal Sheathing (14" x 48").....16c. lb. net base.
" " " Rectangular Sheets other than Sheathing.....18c. " " "
" " " Rod.....17c. " " "
Tobin Bronze Rod.....18c. " " "
Above are for 100 lbs. or more in one order.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

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Wider than ..... and including..	3in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
	in coils.								
No. 13 and heavier	42	42	44	44	44	44	47	47	47
" 14	42	42	44	44	44	44	47	47	47
" 15	42	42	44	44	44	44	47	47	47
" 16	42	42	44	44	44	44	47	47	47
" 17	42	42	44	44	44	44	47	47	47
" 18	42	42	44	44	44	44	47	47	50
" 19	42	42	44	44	44	44	47	48	51
" 20	42	42	44	44	44	46	49	50	52
" 21	42	46	46	46	46	48	51	52	58
" 22	42	46	46	46	48	48	51	55	59
" 23	42	46	46	46	48	48	51	57	60
" 24	42	46	48	50	50	50	53	59	62
" 25	44	47	49	51	51	51	54	61	65
" 26	44	47	50	54	54	54	59	63	69
" 27	44	48	52	56	56	57	62	66	72
" 28	44	48	54	56	57	57	64	70	75
" 29	46	49	56	58	60	60	69	75	80
" 30	46	50	58	60	64	70	78	80	85
" 31	51	55	63	66	71	79	82	85	91
" 32	53	57	65	69	77	85	92	98	103
" 33	55	59	68	73	81	92	99	108	118
" 34	58	63	70	78	86	99	111	118	128
" 35	..	73	78	88	98	108	123	133	..
" 36	..	88	98	108	123	128	143	..	..
" 37	..	112	116	137	152	167	182	..	..
" 38	..	132	147	162	177	192	212	..	..
" 39	..	152	172	192	212	232	..	..	..
" 40	..	182	212	232	252	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11	..	..	96	86	83	77	67	61	61	61
12	..	1.08	96	86	83	77	67	61	61	61
13	..	1.08	96	86	83	77	67	64	64	64
14	..	1.08	96	86	83	77	67	64	64	64
15	..	1.12	96	89	86	80	70	67	67	67
16	..	1.15	99	93	89	83	70	70	70	70
17	..	1.18	1.02	96	93	86	73	73	73	73
18	1.85	1.24	1.05	99	93	86	77	77	77	80
19	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20	1.95	1.31	1.15	1.08	1.05	99	89	86	86	86
21	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	2.05
23	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

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Price, per lb...	41	41½	41½	42	42½	43	43½	44	45	46	47	50	55

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 45 per cent.

GERMAN SILVER TUBING.

4	per cent.	to No.	19,	B. & S.	Gauge,	inclusive	$0.60
6	"	"	19,	"	"	"	.70
9	"	"	19,	"	"	"	.85
12	"	"	19,	"	"	"	1.00
15	"	"	19,	"	"	"	1.15
16	"	"	19,	"	"	"	1.20
18	"	"	19,	"	"	"	1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.
For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 35 per cent.

PRICE OF SHEET SILVER.

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The Practical Application of Scientific Metallurgy to the Foundry and Rolling Mill

By ERNEST A. LEWIS
Birmingham, England

New Alloys

By ANDREW M. FAIRLIE
Copper Hill, Polk County, Tenn., U.S.A.

Reprinted from "THE METAL INDUSTRY," JUNE, JULY and SEPTEMBER ISSUES, 1906

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THE METAL INDUSTRY

61 Beekman Street New York

THE PRACTICAL APPLICATION OF SCIENTIFIC METALLURGY TO THE FOUNDRY AND ROLLING MILL.

By Ernest A. Lewis, Birmingham, England.

It is very difficult to apply modern scientific metallurgy to practical work in a trade in which for years rule of thumb methods have been in vogue. As a general rule the scientific chemist lacks training in practical work and knows very little of actual working conditions in the foundry and rolling mill, on the other hand, many practical men have little or no knowledge of science and do not see that it has a commercial value; then the workmen are often tied to rule of thumb methods and do not like improvements.

It pays a large works to employ their own chemist, if a suitable room is available for a laboratory an expenditure of £100 will provide all the necessary apparatus, but there are many small works where it would not pay to employ their own chemist, but a technical analysis of a copper alloy is not a very great expense and may often save pounds in wages, pots, fuel, etc., by preventing bad metal being made.

The brass trade may conveniently be divided into three branches.

1. The casting of articles in sand from patterns.
2. The casting of plates, rods and tubes for rolling and drawing.
3. The rolling and annealing of sheets, rods, etc.

The first thing to be considered is the purity of the metals employed. As a rule for sand castings, small quantities of impurity are not so harmful as they would be in castings for rolling.

Competition is so great that it is impossible to use pure ingot metals unless for special work and it is in the careful selection of the scrap and the use of the proper amount that at the very beginning of the process a shop can save pounds by rejecting inferior material.

IMPURITIES IN COPPER.

The most serious impurity that is found in ingot copper is Bismuth, and whether for sand castings or for rolling the quantity present should not exceed 0.01%. For specially good castings to give a high tensile strength 0.005% is as much as should be allowed. For very good gun metal castings, either electrolytic copper or a mixture of Electrolytic and Best Select Ingot should be used. In modern coppers Bismuth rarely exceeds 0.02%. For ordinary sand castings tough copper is good enough, but for rolling purposes B. S. or electrolytic must always be used. Good copper scrap such as old tubes are very often as good as B. S. ingot for making yellow metal.

Other impurities found in copper are Arsenic, especially in tough copper and old locomotive tubes and fireboxes, but in quantity up to 0.5% this is not injurious in gun metal; my experience is that it improves it rather than otherwise. Arsenic should not be present in brass for rolling or drawing into tubes. Antimony is without effect up to 0.25% in gun metal castings, but for brass for rolling considerably less than this amount is very injurious; it causes brass sheets to crack at the edges. Antimony should not be present in B. S. ingot in quantity more than 0.01% nor in good tough copper more than 0.05%. Arsenic should not exceed 0.05% in B. S. ingot, but in tough copper it occurs up to 0.5%. Lead does not occur in tough copper or B. S. ingot in quantity sufficient to interfere with its use in the foundry either for castings or for rolling. It should not occur in quantity over 0.1% in tough copper or 0.02% in B. S. ingot.

Tin is rarely present in copper and seldom exceeds 0.05% in tough copper or 0.01% in B. S. ingot.

Iron should not exceed 0.1% in a good copper; in fact, 0.02% is about the average amount.

Nickel is occasionally found in copper in quantity up to 1%. It has a tendency to make gun metal rather hard, and for brass sheets or tubes such copper is unsuitable. A good copper should not contain more than 0.1% nickel.

Sulphur should never be present in copper or at least only in traces.

Phosphorus does not occur in copper ingots, but if scrap copper tubes or rods are used, which have been cast in pots, it is usually present in quantity up to 0.07%. It makes gun metal rather hard for turning.

Electrolytic copper always contains over 99.9% copper. B. S. should contain at least 99.6%, and tough ingot 99.4% upwards.

SPELTER.

Spelter for sand casting need not be of the best quality, a brand cotaining 97% zinc is good enough. For brass rolling, a good deal depends on the mixture; if a hot rolling brass like Muntz metal is to be made a spelter containing 98% zinc or even remelted spelter is good enough. For common cold rolled brass a spelter containing 99% zinc and very little tin is desirable, although commoner qualities often give good results. For the best sheet brass or cartridge metals the special brands of zinc should be used. It must be borne in mind that first class spelter is made by distilling galvanizer's ashes. From a scientific point of view zinc from galvanizer's ashes should be purer than zinc made from the ore, as it is less likely to contain injurious impurity as it is made from the oxide of an already pure metal.

LEAD AND TIN.

Lead and tin can be obtained very pure. Good brands of commercial lead contain 99.95% lead, and is often even purer. Lead is the purest metal, which is made commercially. Good brands of tin contain 99.8% pure tin.

SCRAP.

When scrap of unknown composition is to be used either for sand castings or for castings for rolling it must be carefully picked over and roughly sorted out. The different kinds can then be melted down into ingots and the ingots analyzed for copper, tin, lead and zinc. The composition being thus accurately known, it is easy to find which alloy it can be used in to advantage. This method is rather more expensive than directly melting down the scrap with new metal, but it pays in the long run when good metal is to be turned out. The use of scrap metal without any idea as to its composition, such as is often done, loses indirectly in bad heats, coke, crucibles and wages considerably more money than the cost of an analysis.

Of course when brass for rolling is being made the scrap from this can be melted down with new metal; in fact, all scrap can be so treated when the composition is accurately known. When borings of known composition are to be used up they can, after being put through a magnetting machine to remove iron, be added directly to the heats, but they should not exceed 25% of the total weight; and if they are rich in zinc an allowance for loss of this metal must be made in calculating the heat.

ALLOYS.

We now come to a study of the alloys for various purposes, and why certain alloys are suitable for one class of work and not others.

It would be a good thing if gun metal and other alloys used in engineering brass foundries were standardized and one mixture were used generally for similar purposes, instead of nearly every foundry using their own mixtures. Very often the composition of the mixtures is considered a trade secret, but any competent analyst can find out the composition.

GUN METAL.

The original gun metal alloy is copper=90%, and tin 10%, but this alloy is seldom used. Other metals are generally added for various purposes. Lead is added up to 2%. This is done to make the metal turn easier; it breaks off in short chips in the lathe. Zinc is added up to 2%. This is done to make sounder castings, when zinc is added to gun metal it makes it more fluid. When you add 2% of each of these metals you get a type of alloy which gives very good results. It is tough, easy to turn, gives good castings and wears well.

This is the alloy:

Copper	88%
Tin	8%
Zinc	2%
Lead	2%
	100%

For all steam pressures over 50 lbs. per square inch this alloy should always be used. The lead can be reduced with advantage 1%, and the tin increased 1% for pressures over 100 lbs. per square inch.

I have mentioned that 2% lead is the maximum which should be put in gun metal, but for alloys which are used for pressures under 50 lbs. per square inch a cheap alloy is often used, containing 5% each of tin, lead and zinc, but I do not recommend this alloy except for very common work. Lead does not alloy with gun metal; it is in the free state in the alloy, and when over 2% it tends to separate out in patches, and lead being a soft metal it is worn out of the gun metal by abrasion, the result is leaking fittings. A good rule is never to use gun metal containing over 2% lead for steam fittings of any description. In gun metal containing under 2% lead, it is easily distributed through the alloy and if properly cast is not in patches.

HYDRAULIC GUN METAL.

For hydraulic fittings the lead must not exceed 0.25%, but zinc is often added up to 2%. This gun metal is made harder than usual.

A typical alloy is:

Copper	86%
Tin	12%
Zinc	2%
	100%

For fittings which have not to withstand steam pressures, such as oil cups, a so-called "brassy" gun metal is good enough, containing: Copper, 87%; tin, 3%; lead, 2%; zinc, 8%. It is really a good quality brass with tin added to harden it. The term gun metal should not be used to describe such alloys; it is misleading.

For other ornamental brass castings for cabinet work and such like alloys of copper 70% and zinc 30%, and still cheaper alloys of copper 60% and zinc 40% are used. These alloys are much more easy to cast than the purely engineering alloys.

Gun metal alloys are improved by remelting. Brasses are not improved by remelting.

ALLOYS FOR ENGINE BEARINGS.

These alloys are those in which recent scientific investigations can be applied with considerable advantage. Some bearings are lined with white metal, others have no white metal lining. In the first type of bearing the composition of the alloy is not of great importance, as it is the white metal which takes the friction. An alloy containing approximately copper 85%, tin 11%, lead 2%, zinc 2%, is good enough; it is a convenient type of casting to use up doubtful scrap, provided it is strong enough for the purpose. The composition may vary by 2 or 3%, it makes no difference.

When the bearing itself takes the friction the alloy must be carefully chosen, and it must be made of pure metals and not of scrap. The presence of lead is essential. Some good alloys contain as much as 30% lead and only 5% tin, the remainder being copper. Zinc must never be added to this alloy, as it increases the friction and would be likely to cause hot bearings. A good type of alloy is:

Copper	82%
Tin	8%
Lead	10%
	100%

The greater the proportion of lead present the less tin should be present. The great difficulty in casting these alloys is to cast it in such a way as to prevent the lead separating out; it can be overcome by vigorously stirring immediately before casting and after the metal is skimmed. The alloy must be cast at as low a temperature as is practicable, but experience is needed to gauge the right heat. For bearings of this latter type phosphor bronze alloys are used with good results.

PHOSPHOR BRONZE ALLOYS.

For slide valves and similar purposes where a hard metal is wanted an alloy of copper 85%, tin 15%, to which has been added 0.1% phosphorus, is used. This alloy must be melted and cast into ingots at least twice before being used to get the best results. It must not be cast too hot; at the same time it must not be cast pasty or else the castings will have the appearance of dross if they are broken, and this weakens the metal considerably. The metal must be perfectly fluid when poured. It is better cast too hot than too cold. Other phosphor bronze alloys are essentially gun metals deoxidised with phosphorus and not zinc. There is no advantage in having more than 0.25% phosphorus in any phosphor bronze alloy.

COPPER CASTINGS.

Pure copper cannot be cast in sand without considerable difficulty; in fact, some deoxidiser is always used. For common copper castings from 2% to 5% zinc is generally added to get sound castings; but for electrical work this is useless. The only way to get good electrical castings is to melt pure electrolytic copper in a plumbago crucible under a thick layer of charcoal. When thoroughly melted add 2% silicon copper and stir it in with a stick and cast as soon as ready. Practical experience alone will show the correct temperature for casting copper in sand moulds, and the proper temper of the sand. It must not be cast boiling, but a fairly high temperature is necessary.

IMPORTANCE OF THE CASTING TEMPERATURE.

Although for plain work, whether gun metal or brass alloys are being cast, a moderate temperature, not boiling nor yet pasty, gives the best results. As regards tensile strength, it must be remembered that although good experimental results can be obtained by casting plain rods at a moderate temperature, it will lead to failure if you attempt to cast a complicated pattern with thin and thick parts, or a small article with a core in it, the resulting casting of which has very thin walls. Such articles must be cast immediately the metal has ceased boiling or they

will be drawn. Experience will show the best temperature to cast different alloys for similar castings. Gun metals and phosphor bronzes require considerably larger gates, runners and feeders than brass alloys.

A brass alloy will give a good casting of the same pattern at a much lower temperature than gun metal, because brass is more fluid than gun metal. The larger the casting the lower can be the casting temperature, but neither brass, gun metal or copper should be poured pasty. It is a most unsatisfactory practice and it is often done in foundries, when a lot of boxes are being cast and when the pot is getting empty, to put in the heads of the runners of the first boxes cast and stir them into the metal to make sufficient metal to cast another box, it will be found that the last box of castings are often drawn.

The order of casting a series of boxes should be arranged, if possible, so that boxes containing complicated patterns should be cast first and have the hottest metal, and plain castings which can be cast at a moderate heat last. This will give good results all round.

GENERAL RULES TO GET GOOD CASTINGS.

All metals used in the foundry must be carefully weighed out.

All metals, except it is pure copper for electrical purposes, should be thoroughly skimmed before casting, to remove sand, charcoal and slag. Very fusible slag on the top of gun metal or phosphor bronze can be removed by a little dry, clean sand being stirred into it, and then puling it off pasty. The surface of the metal should be blown with a bellows to remove any sand and charcoal, which has not been skimmed off. A skimmer should be held at the mouth of the pot to keep back dross or oxide, which is continually forming on the surface of molten metal. When casting pure copper the layer of charcoal should be held back with a stick to prevent oxidation of the copper.

The foundry should be kept tidy, especially around the casting furnaces.

If there is a metal warehouse for storing metals, as there ought to be in every well arranged foundry, every parcel of metal of which the composition is known should be labeled, and bins should be kept for putting in the borings and turnings of different alloys. In well managed engineering works the turnings of different alloys are as far as possible kept separate in the turning shops, so that they can be used up again in the same alloy in the foundry, without altering the composition of the mixture.

Separate skimmers and stirrers should be used for each type of alloy.

Crucibles which have been used for phosphor bronze must not be used for gun metal.

If it is found that an alloy is giving unsatisfactory results, do not try altering the mixture. If it has given good results before it will give them again. There is something else at fault, not the mixture. Probably the copper is wrong, or inferior scrap is being used. Take an example of ordinary gun metal containing: Copper, 88%; tin, 8%; zinc, 2%; lead, 2%, after giving good results for months, several heats gave hard metal and difficult to turn. The cause of the trouble was the use of scrap copper rods, which contained 0.1% phosphorus, which were used instead of ingot copper.

ALLOYS FOR THE ROLLING MILL.

STRIP, BOLT AND TUBE CASTINGS.

These should be cast at as low a temperature as possible, without being pasty; but scrupulous care is necessary to remove dirt from the surface or it will show itself later on when the casting is rolled or drawn. There is no need to boil brass in the furnace before casting as is often done; in fact, it is injurious to the metal. The metal should be heated sufficiently to be thoroughly fluid, then removed from the furnace and allowed to cool down to the proper temperature. The ingots should be dressed with a mixture of vaseline oil and powdered charcoal, or lard oil mixed with charcoal.

THE COLD ROLLING ALLOYS.

The best brass rolling alloys are the Tombac alloys, containing from 75% to 85% copper. Only the purest metals can be used in making them. They are mostly used for cartridge cases and high-class ornamental brass work.

The next type are the alloys containing from 70% to 75% copper. They are used in locomotive tubes, also in condenser tubes as well as for sheet brass. Tubes of this mixture are usually specified to contain not more than 0.5% total impurity, or 0.25% of any single impurity.

The next type is common brass, generally known as 2 and 1 mixture, that is: Copper 66 2-3%, and zinc, 33 1-3%.

None of the above alloys can be rolled hot as ordinarily made, that is because the lead that is always present in commercial brasses is in the free state, and when you try to roll it hot the lead which is molten in the metal causes cracks. I discovered some time back that under certain circumstances the alloy of copper 70% and zinc 30% can be rolled hot as easily as yellow or muntz metal, but I am not able to publish details of the process.

THE HOT ROLLING ALLOYS.

The next series of brass alloys are the hot rolling alloys.

The best alloys of this type contain 61 to 62% copper, but cheaper alloys are made with 56 to 60% copper. The best mixture to resist corrosion contains 61.5% copper and about 0.2% tin or iron. When 1% tin is added to yellow metal the alloy known as naval brass is obtained. It contains: Copper, 62%; zinc, 37%; tin, 1%. In the yellow metal alloys the lead is present, combined with a portion of the alloy, and this is the reason that the alloy can be rolled hot.

Screwing metals are types of yellow metal containing 2% of lead. They turn better in the lathe than yellow metal.

ANNEALING TEMPERATURE FOR THE BRASS ALLOYS.

The higher the contents of copper in brass the greater heat will it stand without burning, but although a plate of brass ¼ to ½ inch thick will stand a full red heat without burning the same mixture in the form of sheets 1-32 of an inch in thickness would burn at this temperature. The presence of tin and lead will cause brass to burn at a lower temperature than the same alloy made of the pure metals. From this it will be seen that the purer the alloy the more heat it will stand without burning. In regard to the hot rolling alloys, the alloy of copper 62% and spelter 38% can be rolled at a red heat without injury, but the alloy of copper 58% and spelter 42% can only be rolled at a dull red heat or it will be brittle.

The proper annealing temperatures are approximately as follows:

Thick brass sheets containing 70 to 80% copper..750° C.
Thin brass sheets containing 70 to 80% copper..700° C.
Thick brass sheets containing 60 to 70% copper..700° C.
Thin brass sheets containing 60 to 70% copper..650° C.

THE USE OF THE MICROSCOPE.

During recent years considerable advances have been made to our knowledge of brass alloys by the application of the microscope to examine the crystalline structure, but this method of examination has not yet reached the same practical importance in the brass trade that it has in the iron and steel industries. There have been numerous papers

published describing the methods of preparing metals for microscopic examination, and if a microscope is available very interesting results can be obtained by taking micro-photographs of various brasses after different heat treatment. That is to say, examine the cast metal, then, after breaking down, annealing at different heats for different lengths of time, finally burn the brass and examine its structure.

ANNEALING AND ROLLING OF COPPER.

When speaking of burning copper it must be remembered that there are various kinds of copper. Some varieties are much more easily burned than others. There is copper made in the refinery containing 0.1% to 0.2% oxygen; there is arsenical copper containing 0.4% to 0.6% arsenic also made in the refinery; and there is deoxidised copper cast from pots containing 0.05% to 0.1% phosphorus, and this latter copper is always made from very pure ingot copper. Now, refined copper containing 0.2% oxygen can be made nearly white hot, 950° C, without burning. Arsenical copper will not stand more than a good red heat, 800° C; but the last variety of copper, the deoxidised copper, should never be heated to more than 700° C, and for annealing tubes of this latter kind of copper a dull red heat for ½-hour is sufficient It is bad practice when the ends of a tube only are required to be annealed to put them into the fire hole of an annealing furnace. A special furnace should be built for this purpose.

CRUCIBLES.

A good plumbago crucible should stand on an average 25 heats. I have known them stand more than 40 heats. To economize in crucibles it is best to use a good make of pot even if they are a little more expensive.

COKE.

A fairly hard coke is the best for brass foundries. It should not contain more than 2% sulphur or 10% ash. A thoroughly representative sample of the coke should be tested occasionally in the laboratory.

COAL.

This should be of good quality. It should not contain more than 2% sulphur, 7% ash, or 5% moisture. The calorific power should be about 7,000. Some coals contain from 20% to 25% ash. This is an absolute loss to the manufacturer.

ENGINE OILS AND OTHER STORES.

Large works which have their own chemist will find it to their advantage to test their stores. A competent chemist should be able to advise on these matters as well as on the purity of metals.

ERNEST A. LEWIS.

April 21st, 1906.

NEW ALLOYS.

By ANDREW M. FAIRLIE.*

The formulas of the new alloys enumerated below have appeared in various journals since January, 1902, and are here republished in tabular form for convenience in reference and for purposes of comparison.

Owing to the innumerable combinations possible in the art of mixing metals, it is hard to arrive at a thoroughly satisfactory classification of the alloys. The fact that an alloy usually contains more than 50 per cent of copper or less than 5 per cent. suggests a means of grouping the alloys into two classes. The first class, called "Copper Alloys," consists of the high-copper metals; the second comprises the low-copper and copper-free mixtures, and is designated "White Metal Alloys." This grouping has been adopted in this compilation. The names printed in italics in the two tables show that the figures opposite were obtained by means of chemical analyses.

COPPER ALLOYS.

Name.	Copper. P. c.	Zinc. P. c.	Tin. P. c.	Lead. P. c.	Nickel. P. c.	Aluminum. P. c.	Magnesium. P. c.	Silicon. P. c.	Iron. P. c.	Silver. P. c.	Manganese. P. c.	Tungsten. P. c.	Phosphorus. P. c.
Cupro-Magnesium	90.00	.....	.....	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....
Hydraulic Bronze	75.00	14.00	11.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hardware Metal	50.00	34.90	.....	.....	15.00	0.10	.....	.....	.....	.....	.....	.....	.....
"Phono Electric" Wire	98.55	.....	1.40	.....	.....	.....	.....	0.05	.....	.....	.....	.....	.....
Sterline	68.52	12.84	.....	Trace	17.88	.....	.....	.....	0.76	None	None	.....	.....
Platinoid	54.04	20.42	.....	0.15	24.77	.....	.....	.....	0.47	.....	0.15	None	.....
Manganese Resistance Metal	85.00	.....	.....	.....	.....	.....	.....	.....	3.00	.....	12.00	.....	.....
Manganin	82.12	.....	.....	.....	2.29	.....	.....	.....	0.57	.....	15.02	.....	.....
Trolley Wheel Bronze	92.00	2.00	6.00	None	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hydraulic Metal	83.03	6.00	10.81	0.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acid-Resisting Metal	82.00	2.00	8.00	8.00	.....	.....	.....	.....	.....	.....	.....	.....	Trace
Victor Metal	49.94	34.27	.....	.....	15.40	0.11	.....	.....	0.28	.....	.....	.....	.....
Needle Metal	84.96	5.31	7.96	1.77	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pattern Bronze	90.00	2.50	6.00	1.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Turbine Wheel Mixture	86.77	3.48	8.68	1.07	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aluminum Silver	57.00	20.00	.....	.....	20.00	3.00	.....	.....	.....	.....	.....	.....	.....

WHITE METAL ALLOYS.

Name.	Copper. P. c.	Zinc. P. c.	Tin. P. c.	Lead. P. c.	Antimony. P. c.	Sodium. P. c.	Manganese. P. c.	Nickel. P. c.	Iron. P. c.
Kayserzinn	1.58	.....	92.98	.....	5.44	.....	.....	.....	.....
Tempered Lead	.....	.....	0.08	98.51	0.11	1.30	.....	.....	.....
Improved Britannia Metal	2.31	.....	90.10	.....	7.44	.....	0.15	.....	.....
Soft Bearing Metal	0.42	.....	11.40	80.65	7.53	.....	.....	.....	.....
Alkali-Resisting Alloy	.....	.....	.....	.....	.....	.....	.....	5.00	95.00
White Brass	2.00	34.00	64.00	.....	.....	.....	.....	.....	.....

In the September, 1906, Issue of THE METAL INDUSTRY there was published with Mr. Fairlie's article on New Alloys paragraphs giving a brief description and principal uses of the different alloys mentioned above. We can supply the Sept. number for 10c.

*Chemist Tennessee Copper Company, Copper Hill, Polk County, Tenn.

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MIXED METALS OR METALLIC ALLOYS. A. H. Hiorns. 4¼ x 6¾ inches; 434 pages; 45 illustrations $1.50 $2.00

The best book published on the subject for this price. Takes up the subject where ordinary metallurgical treatises leave off, deals fully with metallic mixtures, and shows how such mixtures are usefully employed. Numerous tables of data and a section on alloys for special purposes.

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A résumé of the operations involved in the manufacture of the various brass founders' alloys, with some carefully chosen tables of mixtures in present use.

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A practical treatise by an expert on coating with tin and zinc; a special chapter on tinning gray iron castings. (This book does not treat of cold galvanizing.)

ALUMINUM. A. E. HUNT. 4¼ x 6½ inches; 240 pages 1.50 2.00

A comprehensive treatise on the production, characteristics, physical and chemical properties, working and finishing, alloying, etc., of aluminum. Also includes general table and data of interest to the metal worker.

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The best text book for students and workers in metal. The work is prepared by an expert, and the subject is covered in a plain and concise manner, with the aid of many clear drawings. For the most part the descriptions deal with work actually carried out. Good for the beginner as well as the expert.

ART ENAMELING ON METALS. Henry Cunynghame; 5¾ x 7¾ inches; 188 pages; illustrated... 2.00 2.50

The art of enameling is treated from a practical standpoint. Every step in the process, from the selection of the design to the final work, is treated in a plain and comprehensive way. The book is of great value to the one familiar with the art as well as to the student.

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A molder's pocket dictionary, containing over 2,000 words, terms, and phrases of special import in the foundry; also notes on foundry practice and tables.

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PUNCHES, DIES AND TOOLS. Joseph V. Woodworth; 5½ x 8 inches; 500 pages; 700 illustrations 4.00 4.5

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PRACTICAL METAL TURNING. Joseph G. Horner; 5½ x 8 inches; 404 pages; illustrated 3.50 4.0

This is a practical book, covering in a comprehensive manner the modern practice of machining metal parts in the lathe. It treats of the lathe and attachments, the modernized engine and turret lathe, and their functions. There are valuable chapters on special work, such as grinding, tool holders, speeds, feeds and the like.

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It will contain valuable articles by the leading metallurgists of the world and statistical information which will make it a reference guide for the year 1908.

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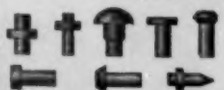

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FOR INDEX OF ADVERTISEMENTS SEE PAGE 30

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Crucible Brass Melting Furnace

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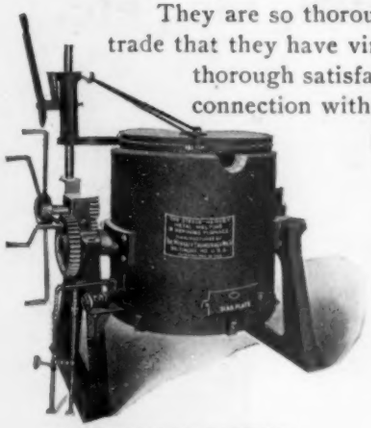

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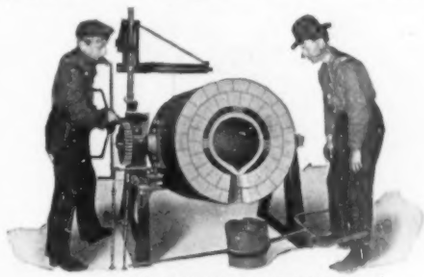
OUR STANDARD

Tilting Furnace from which the Crucible IS NOT removed in pouring the metal.



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The Monarch Eng. & Mfg. Co., Baltimore, Md.

Gentlemen—For your information, we secured 58 heats out of the first crucible furnished with the No. 60 furnace, melting 9,085 lbs. of copper on a consumption of an average of 2.13 gals. of oil per 100 lbs. of metal, which exceeds our expectations and your guarantee, and we fully believe we can secure an average of 50 heats per crucible, and trust that the No. 125 which we have ordered and the core oven and Crucible Heater will prove equally satisfactory.

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It may be of interest to you to know we have just taken 60 heats from the second Crucible in your No. 60 Furnace. This Crucible has melted 9,600 lbs. of metal before going to pieces.

February 8, 1907.

It may be of interest to know that we took a No. 60 Crucible out of the Furnace after the 66th heat. This Crucible melted 10,560 lbs. of metal. This Crucible is perfectly sound and there are no indications of cracks or holes.

Yours truly,
THE SAYRE STAMPING CO.,
W. T. GOODNOW, President.

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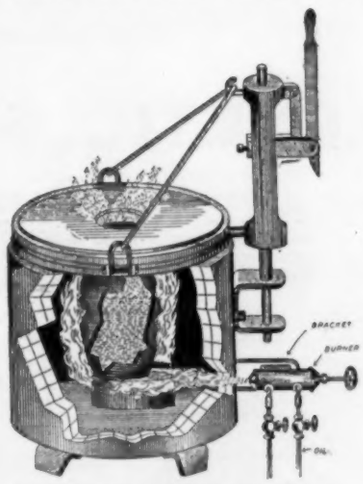
For those who prefer to **lift their crucibles** out of the fire chamber, as in the old **coal** or **coke practice**, we **strongly** recommend the above, as per cut. This style of furnace we have had on the market for several years and they are now installed in various brass foundries. **We guarantee our customers absolute satisfaction.** They are constructed so as to be placed below the floor level, if **desired**, and the crucibles are lifted out in line with old practice. We sell them at a lower price than our **Standard**, because they are simpler of construction and less in tonnage.



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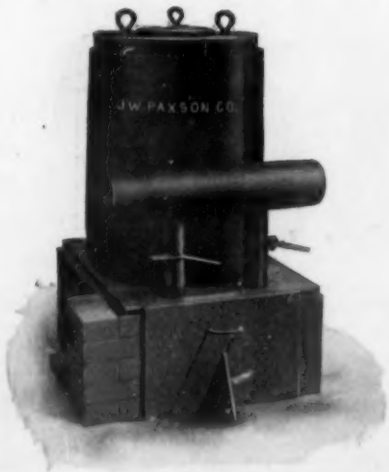

Fig. 621
Forced Draft Furnace

Fig. 622
Natural Draft Furnace
"SQUARE"

Fig. 623
Natural Draft Furnace
"ROUND"

Also made with drop-grate, and with closed bottom to be used with forced draft

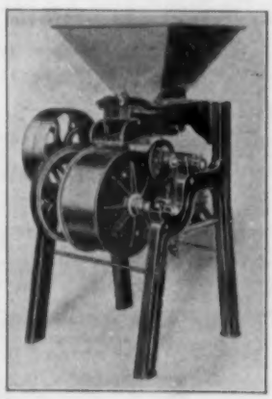

Fig. 76
The Paxson-Sawyer Magnetic Separator

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WE ARE NOW MANUFACTURING THESE SEPARATORS FOR SEPARATING METAL TURNINGS

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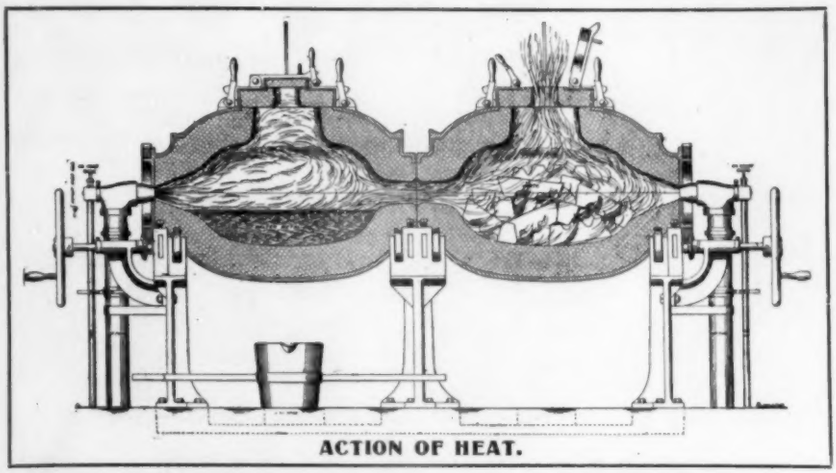

ACTION OF HEAT.

which melt 50 per cent. more metal, fuel for fuel, in one-half the time required by either single chamber or crucible oil fired furnaces, by UTILIZING HEAT, WASTED BY OTHER METHODS. See cut.

With the co-operation of the foundry management we can prove every assertion we make. We can MELT METAL MORE ECONOMICALLY THAN BY ANY OTHER METHOD and are willing to demonstrate the fact by sending a furnace on trial subject to approval with any accessories you may require and accept its return in lieu of payment if not satisfactory.

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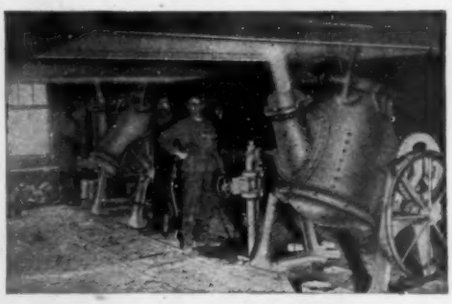

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Width	29½	"
Depth	32⅞	"

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If you make any PHOSPHOR BRONZE, you will doubtless agree with us that it is the worst metal there is to cut into a core. The above mixture is used by a foundry making this class of work and they say they get a cleaner cored surface than by anything they ever used. ¶ A barrel on trial to prove its merits. ¶ Order it today. :: :: ::

THE DETROIT FOUNDRY SUPPLY CO.

DETROIT, MICH. :: :: :: WINDSOR, ONT.

FOR PERFECT PARTINGS
ACCEPT NO OTHER
SEE TRADE MARK

Suitable for Bronze, Brass or Any Other Metal

FAR SUPERIOR TO
Lycopodium—Charcoal—Charcoal Facings

FOR Straight and Difficult Lifts — Sticky Patterns, Slanting Copes and Deep Chasings

PERFECT PARTINGS
MEAN
Sharper Castings — Smoother Surfaces
Perfect Corners — Easier Lifts

DOGGETT'S PARTING
PERMITS
Swabbing and Slicking—Will not burn off the face of the mould, wash or cut.

Manufactured by
Stanley Doggett, 101 BEEKMAN STREET NEW YORK CITY, U. S. A.

DISTRIBUTING AGENTS:
Messrs. S. H. Brand & Co., Chicago, Ill.
The J. S. McCormick Co., Pittsburg, Pa.
Detroit Foundry Supply Co., Detroit, Michigan.
Western Foundry Supply Co., East St. Louis, Ill.
N. Y. Sand & Facing Co., Brooklyn, N. Y.
Cutter, Wood & Stevens, Boston, Mass.
Frank E. Sutch, Harrison Bldg., Philadelphia, Pa.

Working Samples Sent Free Upon Request

MAHOGANY FOR PATTERN WORK
Try our special grade *costing* no more than *White Pine.* MAHOGANY is a natural pattern wood and we have solved the question of price.

Lewis Thompson & Co., Inc.
18th St. and Indiana Ave. **PHILADELPHIA, PA.**

EMIL SCHNEIDER
298 to 306 South St., NEWARK, N. J.

Smelter and Refiner of
Gold, Silver and Copper
and Manufacturer of
Soldering Fluxes

Will pay very highest prices for materials containing above 2 per cent. copper. Upon receipt of 2 oz. samples we will submit best prices on any of the following named materials: Grindings, Polishings, Buffs, Tailings, Sweepings, Skimmings and Washing Mud.

OTTO ENGINES

Are "Otto" Engines Dependable?

Gentlemen:

As you will doubtless remember, two years ago last fall, we installed one of your 21 H.-P. "Otto" Gasoline engines, and ran the same 103 days and nights without stopping. One year ago water was high and the engine was not run. Last fall water was again too low to enter our intake, and the engine and pump was started on November 2, 1906, and has run continuously for 3,523 hours. Is not this a good record?

Yours truly,
BRISTOL ACQUEDUCT CO.
Bristol, N. H., 4-1-07.

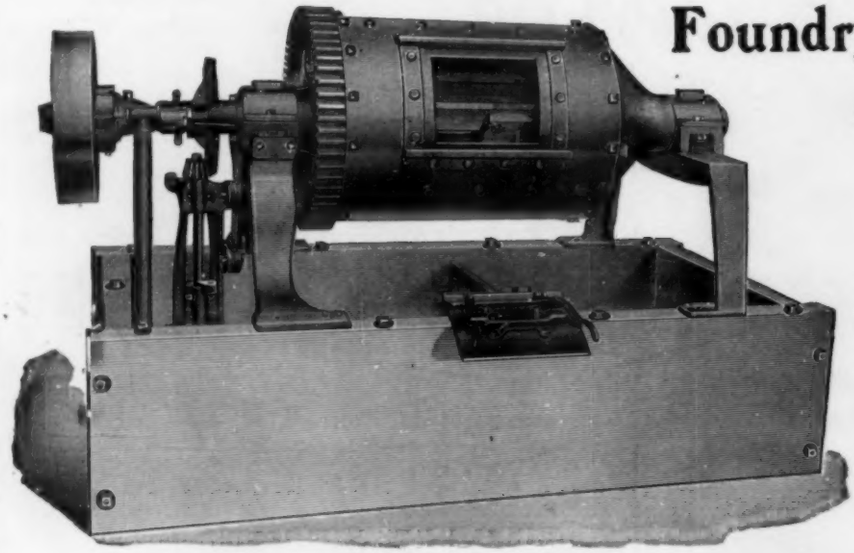
OTTO OTTO OTTO

OTTO GAS ENGINE WORKS, Phila, Pa.
STANDARD OF THE WORLD

THE W. W. SLY MFG. COMPANY

Foundry Equipments

CLEVELAND, O.



BRASS CINDER MILL (2 Sizes)

AUTOMATIC RESIN GRINDER

We Make Steel Exhaust Mills to Clean Castings weighing from one ounce to two tons. The best and cheapest in the world. Ask for Catalogue.

MONARCH CRUSHER AND PULVERIZER

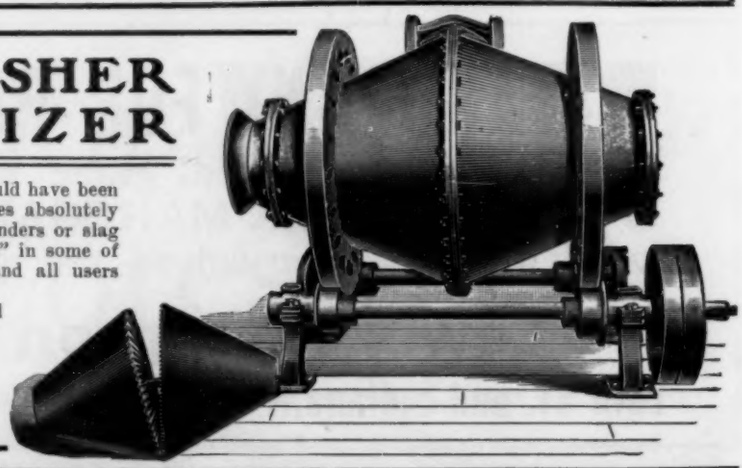
Many a dollar has been lost in the foundry that could have been saved had "The Monarch" been in operation. It does absolutely and thoroughly reclaim the metal from the ashes, cinders or slag of brass furnaces. We have installed "The Monarch" in some of the leading brass foundries and smelting works, and all users advise that this machine is giving satisfaction.

It is surely a great money and labor saver and you should know about it.

O. J. MOUSSETTE, Manufacturer

Tools, Dies, Presses and Special Machinery

Driggs Ave., cor. North 10th Street, BROOKLYN, N. Y.



CRUCIBLES for use in the STEEL-HARVEY FURNACE are one of our specialties. We have made a special study of the requirements and conditions they are subject to, and we have perfected a Crucible which will outlast any Crucible on the market to-day.

Send for our special catalog on STEEL-HARVEY CRUCIBLES.

THE WATERBURY CRUCIBLE CO., Waterbury, Conn.

London Office: 28 Victoria Street

ROSS-TACONY CRUCIBLE CO.

TACONY, PHILA., PA.

HIGHEST GRADE ON THE MARKET

Why not try these superior goods

ROSS-TACONY CRUCIBLE CO.

Ceylon Graphite Crucibles

Sizes 0 to No. 300

For Melting Brass, Bronze, Aluminum, Copper, Silver, Gold, and all of the non-ferrous metals and alloys
Special Shapes and Sizes

ALSO

RETORTS

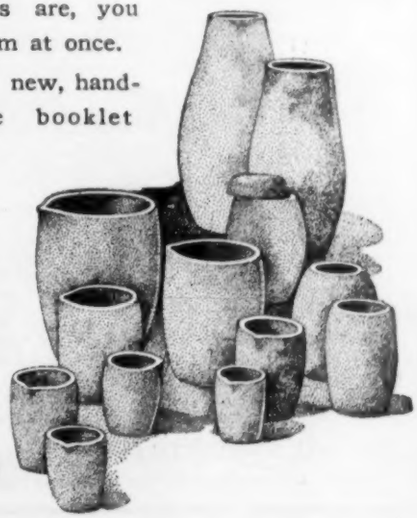
TAUNTON CRUCIBLE COMPANY
TAUNTON, MASS.

Dixon Crucibles

The Kind That Last

When proper care accompanies the use of Dixon's Crucibles they will be always found to give the very best of service. If you do not know just how good these crucibles are, you should try them at once.

Write for new, handsome crucible booklet 12-A.



JOSEPH DIXON CRUCIBLE COMPANY
JERSEY CITY N. J., U. S. A.

ANNOUNCEMENT

¶ All users of **RETORTS** and **CRUCIBLES** will be glad to learn that there is another manufacturer from whom they can buy the highest quality of **Ceylon Graphite Crucibles.**

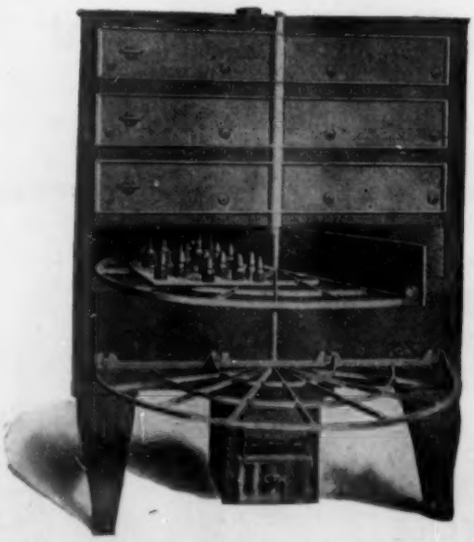
¶ Before **you** make contracts for 1908 write to the

Paige Retort and Crucible Company
TAUNTON, MASS.

¶ Edwin D. Paige, the Treasurer of the Company, has had 19 years' experience in the manufacture of Crucibles.

THE LATEST AND BEST
Improved Portable Core Oven

PATENTED



More Shell Room. No Escape of Heat in Loading or Unloading. Economical in Fuel. Practical in All Respects.

Send for further particulars

SOLE MANUFACTURERS

THE HILL & GRIFFITH CO., Cincinnati, Ohio, U. S. A.

Also Manufacturers of Graphite, Plumbago, Foundry Supplies and Equipments.

Crucibles.

All sizes and for all purposes.

No. 0 to No. **400.**

Established 1866.

R. B. SEIDEL, Inc.

Philadelphia Black Lead Crucible Works,

1322-34 Callowhill Street, PHILADELPHIA

SEE PAGE 32

For a List of Valuable Articles on the Founding and Finishing of .. Metals ..

TAYLOR CRUCIBLES

For Years the Recognized Standard for Uniform Service

IF INTERESTED WRITE US

ROBERT J. TAYLOR, INCORPORATED

1900 to 1916 Callowhill Street *PHILADELPHIA, PA.*

TURNER PATENT SPRUE OR GATE CUTTER

is strong and rigid, therefore durable,

Good for light and heavy work; plenty of room for all sizes of castings.

Good adjustment, good frame, all necessary requisites.

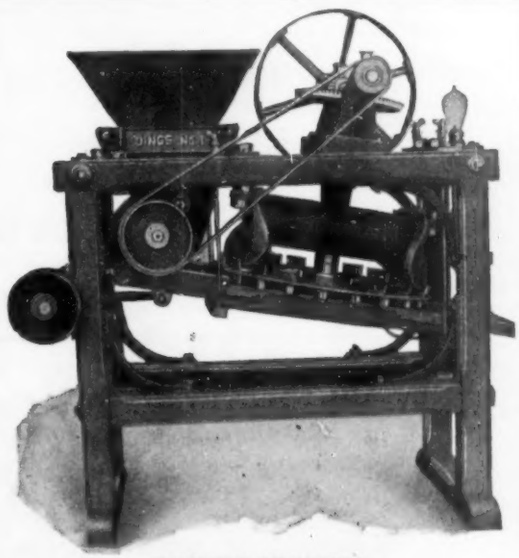
Made only in one size.

Send for Circulars

TURNER MACHINE COMPANY

2049 N. SECOND ST., PHILADELPHIA, PA.

MAGNETIC SEPARATORS



THE DINGS SEPARATOR

DIFFERENT KINDS AND SIZES MADE TO SUIT ANY REQUIREMENTS

DINGS ELECTRO-MAGNETIC SEPARATOR CO. MILWAUKEE, WIS.

Annealing Without Oxidation by Automatic Machines

BATES & PEARD ANNEALING FURNACE CO.

C. M. DALLY, Agent, 29 Broadway, N. Y.

NO PICKLING — Large Saving in Labor and Fuel

NO SCALE — Illustrated Catalogue Sent on Application.

THE Ad. Writing Department of THE METAL INDUSTRY prepares advertising copy without charge. If it is a task for you to write your advertisement, write to THE METAL INDUSTRY.

MACKELLAR'S PREPARED CHARCOAL

FOR BRASS FOUNDERS

Has a wide reputation for superiority. Write for samples, prices and full information.

THE PEEKSKILL FACING MILLS — Established 1844. Incorporated 1902.

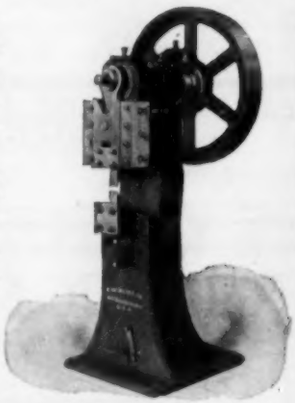
Address R. MacKELLAR'S SONS CO. Peekskill, N. Y.

For Index to Advertisements See Page 30.

"BLISS"

STILES" POWER SPRUE CUTTER

These machines are especially designed to meet the requirements of Brass Founders and Manufacturers of other soft metal castings. They are built for hard service and will handle the heaviest class of work. When desired they can be fitted for direct motor drive.



Write us for further information.

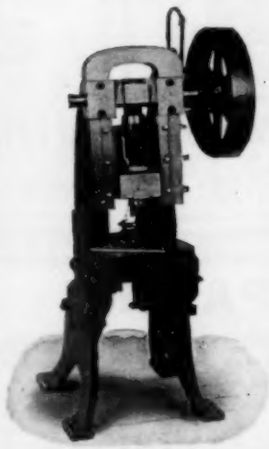
Remember, we make presses for every sheet metal need Question us.

E. W. BLISS CO.,

23 ADAMS STREET, BROOKLYN, N. Y.

Agents for Chicago and vicinity, Stiles-Morse Co., 138 Jackson Blvd., Chicago, Ill. EUROPEAN OFFICE—100 Blvd. Victor Hugo, St. Ouen (Paris), France.

"THE ATLAS"



NO. 103 IN STOCK

Power, Foot and Drop Presses, Spinning, Edging, and Turning Lathes, Clock or Manufacturing Drills.

Slitters, Flattening and Straightening Rolls. Tube, Rod and Wire Draw Benches.

Special Machines Built on Contract to your Drawings.

THE ATLAS MACHINE CO.

31 CANAL STREET WATERBURY, CONN.

SILVERWARE MANUFACTURERS

Send for Catalog S to see what a fine job we make of fitting up the Poppets for the Drop Press.

We also manufacture the Peck Automatic Drop Lifter, described in Catalog S.

THE PECK DROP PRESS WORKS,

NEW HAVEN, CONN., U. S. A.

THE METAL INDUSTRY SIDE LINES

CATALOG BUREAU.

We have established a Catalog Bureau and are prepared to do all the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding—in fact for the entire job from beginning to end or any part of it. Let us know your needs and we will tell you exactly what we can do and what it will cost you.

DAILY METAL PRICES.

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copy sent for the asking.

ANALYZING AND TESTING BUREAU.

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost of analysis or test furnished on receipt of sample.

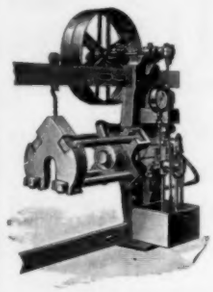
AD. WRITING.

This department prepares advertising copy and makes cuts, photos or drawings. Our experience, and what skill we may have in ad. writing, are at your disposal at all times and as often as you may desire without cost to you. If it is a task for you to get ready your advertisements, send to THE METAL INDUSTRY.

INFORMATION BUREAU.

Any concern intending to buy metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain this information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds.

THE METAL INDUSTRY, 61 Beekman Street, NEW YORK



Hydraulic Forging Presses

We have just issued a catalogue of 130 pages describing and illustrating over 100 different hydraulic presses and tools whose main purpose is the making and breaking of force fits in the assembling or separating of machinery and similar work.

Write for Special Forcing Catalogue.

THE WATSON STILLMAN CO.

26 CORTLANDT STREET, NEW YORK CITY

FOR BRASS AND COPPER, GERMAN SILVER, ETC.

MACHINERY

Alligator Shears,
Bull Blocks,
Cabbaging Machines,
Cut-Off Saws,
Draw Benches,
Drying Out Machines,
Drop Presses and Hammers,
Metal Straighteners,
Power Presses,
Rolling Mills,
Slitters, Gang and Single,
Shear Presses,
Scraping Machines,
Sprue Cutters,
Swaging Machines,
Tube Pointers,
Trimming Presses
Wire Flattening Mills,
Winders and Coilers,
Wire Mill Machinery.

Built by The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., U. S. A.

The TORRINGTON MANUFACTURING CO.

TORRINGTON, CONN.

Finishing Machinery for Brass and Copper Mills to Order

Acid Cleaning, Steam and Sawdust Drying-out Machines.
Power Presses, Single and Double Action Cam or Crank.
Flattening, Straightening and Overhauling Machinery.
Multiple Plunger, Cut and Carry Presses.
Slitters, Scrap Cutters and Coilers, in a variety of Styles and Sizes.
Channel Iron Mill Trucks to suit any Requirements.
Metal Saws and Power Shears.
Drawbenches.

SPECIAL MACHINERY AND TOOLS OF ANY DESCRIPTION

ROLLS

FOR

Steel, Iron, Brass, Copper and Rubber Works

PHILADELPHIA ROLL & MACHINE COMPANY

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New England Representatives:
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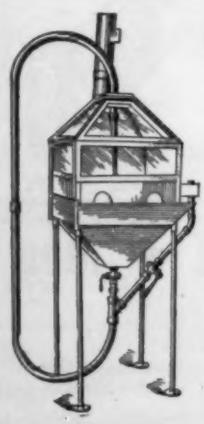
272 Franklin Street
Boston, Mass.

Cable Address:
"PHILROLLCO., PHILADELPHIA"
Long Distance and Local Phone
LOCUST 825



SIPPEL PATENT SAND BLAST

PATENTED SEPT. 16, 1902.

For cleanliness, perfect work and rapidity of action it is without an equal. A trial will cost nothing.

References from leading Jewelers and Brass Finishers will be furnished upon request.

Correspondence solicited, and all information cheerfully furnished. For full particulars and price address

THEO. A. SIPPEL

Patentee and Sole Manufacturer

205 McWhorter Street, Newark, N. J.

For a List of Valuable Articles on Plating and Polishing

See Page 32.

Cleaning by Electricity

IN the plating department, the practice of electrolyzing the cleaning solution is rapidly superseding the old method of cleaning by simple immersion, and rightly, too, because this new system accomplishes wonderful results, and is a long step toward solving the cleaning problem in the plating room.

Electric Cleaning Compound

is prepared, all ready to use, by merely dissolving in hot water and connecting up the electric current.

IT cleans thoroughly and quickly.
IT does not tarnish the metal.
IT is much more economical than cyanide and potash cleaners.
IT is adapted for iron, brass, zinc, tinned, soldered and composition metals.
IT does not throw off poisonous gases as cyanide cleaners do.

IT is shipped ON APPROVAL—in 200 or 400-lb. barrels—at three cents per pound F. O. B. Cleveland.

Inquiries solicited.

THE IMPERIAL CHEMICAL COMPANY
(Manufacturers of Cleaning Compounds for Electroplaters)
1838 CENTRAL AVE., S. E. CLEVELAND, OHIO

SOMETHING NEW FOR THE BUFFING, POLISHING AND GRINDING ROOM

Patent Separator

V. & L. Patent Separator, Hood and Metal Saving Device

HUNDREDS OF THEM IN USE WHY NOT BE UP-TO-DATE?

This Separator is constructed to separate the lint and dust from the air. Also can be placed next to the fan and collects material in bottom.

VENDERBUSH & LOOMAN
177 LARNED ST., WEST, DETROIT, MICH., U.S.A.

Patent Hood and Metal Saving Device

Save Money

The hood and metal saving device for polishing or grinding wheels can be attached easily to machine and saves from 5 to 20 lbs. of metal per day.

Dumping Position.

Operation of BAIRD TILTING TUMBLERS is VISIBLE, not BLIND

Two size machines, No. 1 and No. 2, will take Barrels of all kinds up to 36 in. diameter.

New Catalogue "C" tells all.

BAIRD TUMBLERS

are quick and easy to operate, built STRONG to withstand rough usage and will run in either position shown in cuts or at any intermediate elevation.

WRITE NOW

THE BAIRD MACHINE CO., Oakville, Conn., U. S. A.

Elevated Position.

BLACK GUN METAL FINISH OR BLACK OXIDE ON STEEL OR IRON

The kind you admire on the imported Cigarette Cases, Match Safes, Lockets, etc.

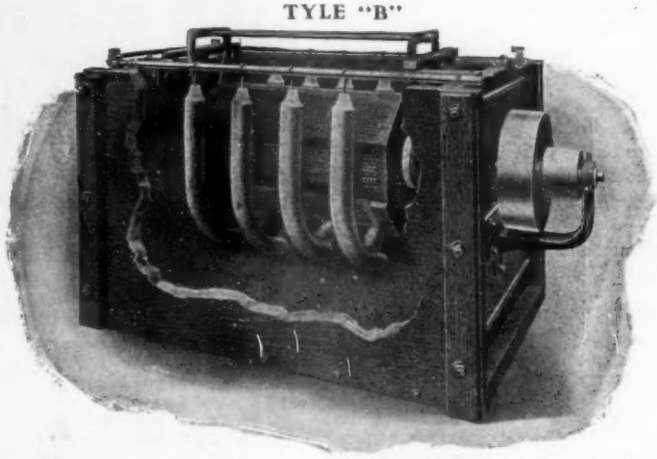
We have perfected the process, the production IS SIMPLE, NO SPECIAL APPARATUS REQUIRED and a boy or girl can do the work. We will dispose of the process to reliable and responsible concerns.

We are the manufacturers of PLATING SALTS in dry form and the Originators of Gilding Salts for producing Rose Gold, Green or Antique Green Gold, etc. Dissolve the salts in water and solution is ready for work. They contain the gold and the chemicals. We cater to the Jewelry Trade since 1890.

Write for Circular. **U. S. ELECTRO-CHEMICAL CO. 78 Lafayette St., New York**

Mechanical Electro-Plating Apparatus

TYLE "B"



Patented June 22, 1897, Feb. 24, 1903, Oct. 11, 1904. Other patents pending.

The most efficient plating apparatus in the market. Over 500 in use by the trade

We will finish sample lots of work without charge.

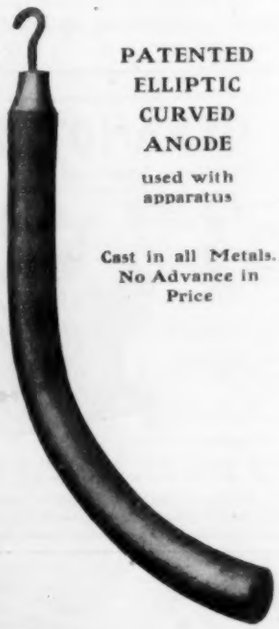
This apparatus is a proved money saver where small work is to be plated. Can be used in Nickel, Copper, Brass, Zinc and Silver Solutions.

No Stringing. No Wire Used. No Metal Plating Trays or Baskets. No Unstringing. No Loss of Metal.

Capacity: 50 lbs. to 500 lbs., according to size.

Basket can be removed at will—without interfering with drive. In larger sizes basket is raised and lowered automatically.

Useful for plating: Bolts, Nuts, Rivets, Screws, Buckles, Ferrules, Typewriter and Sewing Machine Parts, Lamp Fixtures, Saddlery and Trunk Hardware, Carriage Trimmings, Screw Tops, Shells, Stove Fittings, Locks, Keys and small work.



PATENTED ELLIPTIC CURVED ANODE

used with apparatus

Cast in all Metals. No Advance in Price

Apparatus is Used for Electro-Galvanizing Small Articles

WE CAN FURNISH A LIST OF OVER 200 USERS OF THIS APPARATUS. MANY OF THE LARGER FIRMS ARE USING TEN OR MORE

WE HAVE MANY TESTIMONIALS INDICATING A LARGE SAVING THROUGH THE USE OF THIS APPARATUS IN PLATING SMALL WORK

Testimonial:

"The plating apparatus we have installed has proven a happy acquisition to our plating room. We send you this order for two additional apparatus."

WRITE FOR BULLETIN NO. 113

The HANSON & VAN WINKLE COMPANY

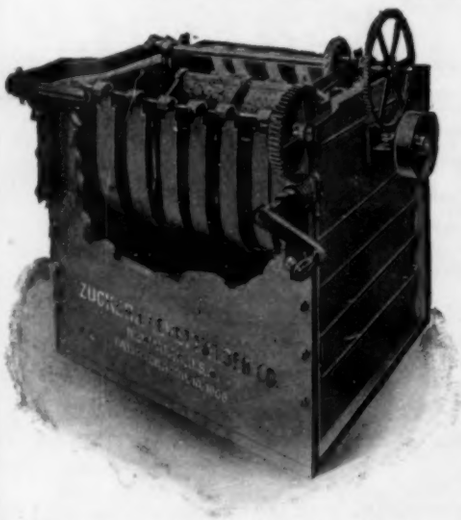
Manufacturers of Dynamos from 50 to 5,000 Ampere Capacity, and all Supplies for Electro-deposition.

(WRITE FOR BULLETINS 105 and 112)

Main Office and Factory
219-221 Market Street,
NEWARK, N. J., U. S. A.

Branches
28 South Canal Street,
CHICAGO, ILL., U. S. A.

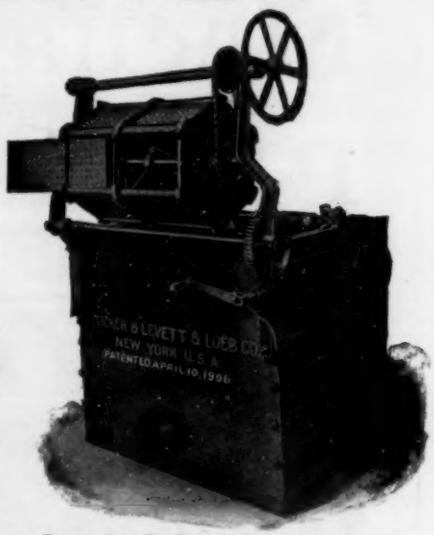
THE ROTOPLATER



Patented in U. S. and Canada, April, 1906.

Plating and Finishing at One Operation in Nickel, Copper, Zinc, Brass or Bronze.

All sorts of small work, such as nuts, bolts, screws, etc., can be economically and quickly Plated and Finished at one operation, labor of stringing also being done away with. The apparatus is fitted with a Crank and Gear by which the cylinder can be raised out of the solution to receive or discharge work. We make for this apparatus special curved anodes so that the anode surface is at all points equidistant from the work.



Patented in U. S. and Canada, April, 1906.

We should be pleased to receive small sample lots of work to be plated without charge to demonstrate the practicability of the apparatus, or it can be seen in practical operation at our works.

For further particulars and prices apply to the Patentees and Sole Manufacturers,

ZUCKER & LEVETT & LOEB CO., New York City, U. S. A.

Electro-galvanizing Outfits Without Royalty on Solution. Low Voltage Generators; and Direct Connected Generator Sets, 50 to 10,000 Amperes Capacity. Complete Plants Installed and All Supplies for Electro Plating and Polishing.

PLEASE MENTION THIS PAPER WHEN WRITING

EVERYONE

DOING

PLATING

Back of Anode

can save 25-50% of the cost for anodes and chemicals by adopting the use of basket anodes.

Not an ounce of Metal wasted or sold for scrap.

Better investigate and find out what you can save.

American Nikeloit & Mfg. Co.

PERU, ILL.

PLATING DYNAMOTORS

1907 Model

Secondary or Plating End

Primary or Power End

A Plating Dynamo and Power Motor **combined in one,** self-operated by any **Direct Current** Light or Power Circuit. **(No motor, belts or pulleys required), Fully warranted. For Gold, Silver, Nickel and Copper Plating, etc.**

Wound to run on 110, 220 or 500-volt circuits. Will deliver to the tank a **4 to 10 volt** current for plating exactly like the regular Plating Dynamos.

Cost to run, 1 to 5 cents per day, according to size. Price $39 to $96.

Write for particulars.

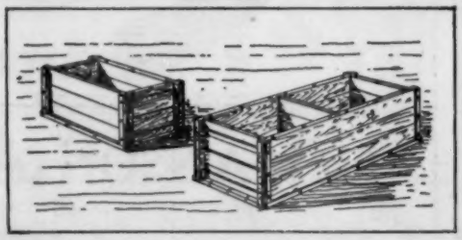
Patented in U. S. and Foreign Countries.

We Solicit a Visit to Our Salesrooms.

THE W. GREEN ELECTRIC COMPANY, 81 Nassau Street, NEW YORK, U. S. A.

Mfrs. of Electric Lathe Motors, Plating Dynamos and Plating Dynamotors

TANKS



Electro-Plating Tanks

A SPECIALTY

Write for Prices

THE A. T. STEARNS LUMBER CO., Neponset, Boston, Mass.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion. Answers sent in our care will be forwarded.

METALS AND EQUIPMENT FOR SALE

FOR SALE.

Second Hand Heavy Geared Wire Bar Slitting Machine, Waterbury Farrel Foundry Machine Co.'s make, in first-class order. 2 sets arbors for slitting 3/8" x 1/2" and 1 1/8" x 3/8". Will sell cheap.

REED & BARTON, Taunton, Mass.

FOR SALE—A lot of new SHEET BRASS and ALUMINUM at a bargain. WALSH'S SONS & CO., Newark, N. J.

FOR SALE—One No. 2 Moussette Steel Crusher, F. O. B., Newark, N. J. In use four months. Cost $350. Address F. O. B., care THE METAL INDUSTRY.

FOR SALE—One 6 H. P. and one 2½ H. P. Meitz & Wiess kerosene engine. In good condition. Low price. LUMEN BEARING COMPANY, Buffalo, N. Y.

FOR SALE—A World Plating Dynamo about 6 volts, 300 amperes, in good working condition. Has been run on 400 gallon brass solution, 200 gallon nickel and copper. Only fault too small for our increasing business. Address THE METAL MANUFACTURING CO., 106 Park St., New Haven, Conn.

FOR SALE—One Modern Moulding Machine that has been slightly used, made by the Arcade Manufacturing Company, Freeport, Ill. Can be seen at our Chicago plant. Address CHICAGO, care THE METAL INDUSTRY.

FOR SALE—A 10 H. P. Nash Gas Engine, A1 condition. Price $150. Address ENGINE, care THE METAL INDUSTRY.

FOR SALE—A quantity of Spanish Felt and Muslin Buff Wheels that have been used down to 4 and 5 inches diameter and are now too small for use on our machines. Address THE WEHRLE CO., Newark, Ohio.

FOR SALE—Patent on Automatic Computing Scale, on royalty basis. Address V. D. ADKINS, Ashland, Ky.

FOR SALE—5 to 10 tons prime remelted SPELTER; also 5,000 pounds TERNE METAL. Quotations upon application. Address P. McLAUGHLIN'S SONS COMPANY, 230-236 North Twelfth street, Brooklyn, N. Y.

METALS AND EQUIPMENT WANTED

WANTED—To manufacture by a well equipped plant, some foundry machine or device. Can furnish capital, engineering experience and a first-class manufacturing plant. Address HAWLEY DOWN DRAFT FURNACE COMPANY, Chicago, Ill.

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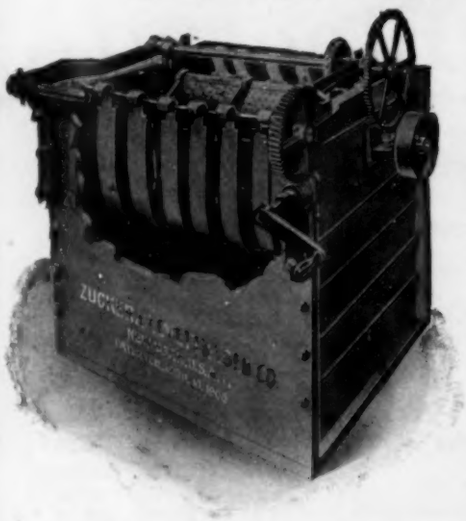

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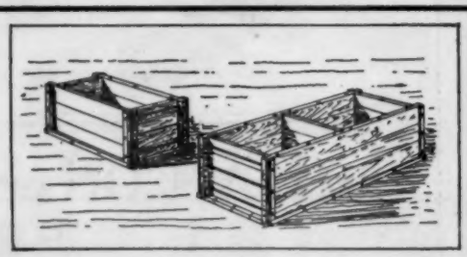

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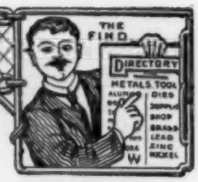

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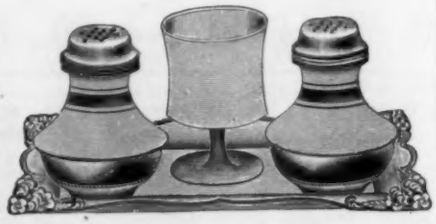

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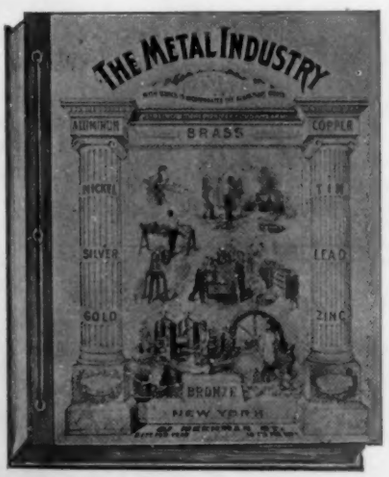

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We carry the best grades of Western Spelter, including "M. & H.," "Brass Special," etc. We also sell remelted Spelter at a lower figure, and if you buy from us you are sure that you are getting new metal at the lowest market rates, unless remelted Spelter is specified. Besides Spelter, we have in stock ready for immediate delivery every other metal that the brass founder needs.

We are also agents for Parson's Manganese Bronze and Taylor's Crucibles.

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